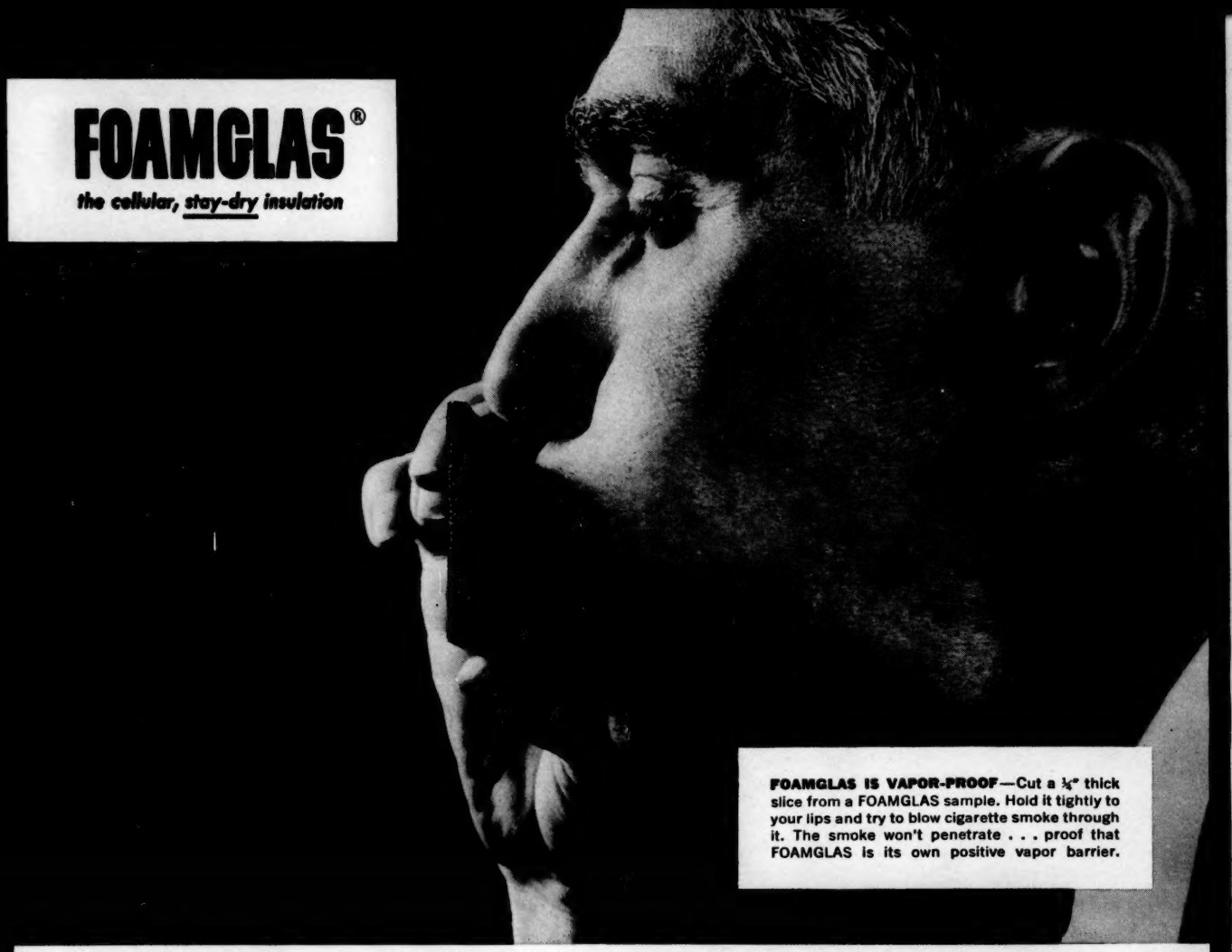
INDUSTRIAL REFRIGERATION

FOAMGLAS®

the cellular, stay-dry insulation



FOAMGLAS IS VAPOR-PROOF—Cut a ¼" thick slice from a FOAMGLAS sample. Hold it tightly to your lips and try to blow cigarette smoke through it. The smoke won't penetrate . . . proof that FOAMGLAS is its own positive vapor barrier.

Vapor can ruin ordinary insulations . . .

Prove to yourself that FOAMGLAS is vapor-proof!

Send for a sample and test it!

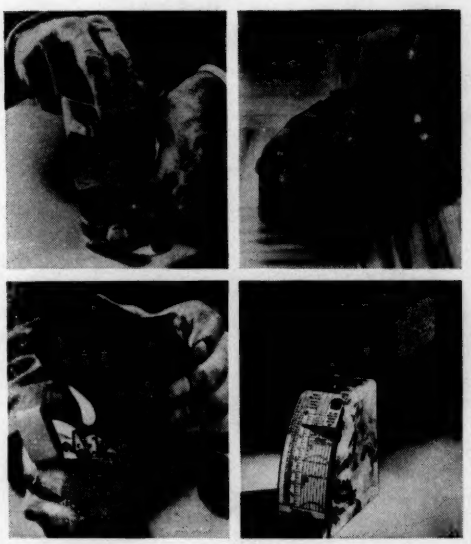
Nature exerts almost constant pressure to force heat and moisture vapor through a thermal insulation. Permeable insulations absorb that vapor. Even expensive vapor barriers cannot always insure absolute protection.

Once vapor enters an insulation —and condenses there—insulating value starts to nosedive . . . because moisture conducts heat. The *real* cost of a permeable insulation may multiply two or three times . . . in terms of lost insulating value and the resulting increase in heating and cooling costs.

That's why it pays to specify FOAMGLAS for true insulating economy. This unique all-glass insulation is naturally immune to vapor attack. Composed of millions of sealed cells, each a separate insulating unit, FOAMGLAS repels moisture in any form . . . liquid or vapor. Its insulating efficiency can never vary, and no costly vapor barrier is needed to protect it. Prove it to yourself with the simple test illustrated above.

In a few minutes, in your own office, you can test the whole combination of properties that makes FOAMGLAS unique among insulating materials. These properties have been proved not only by rigid scientific tests, but by hundreds of actual insulating applications. Send for a free sample and complete testing directions today. Address:

Pittsburgh Corning Corporation
Dept. T-27, One Gateway Center
Pittsburgh 22, Pennsylvania
In Canada: 57 Bloor St. W., Toronto, Ont



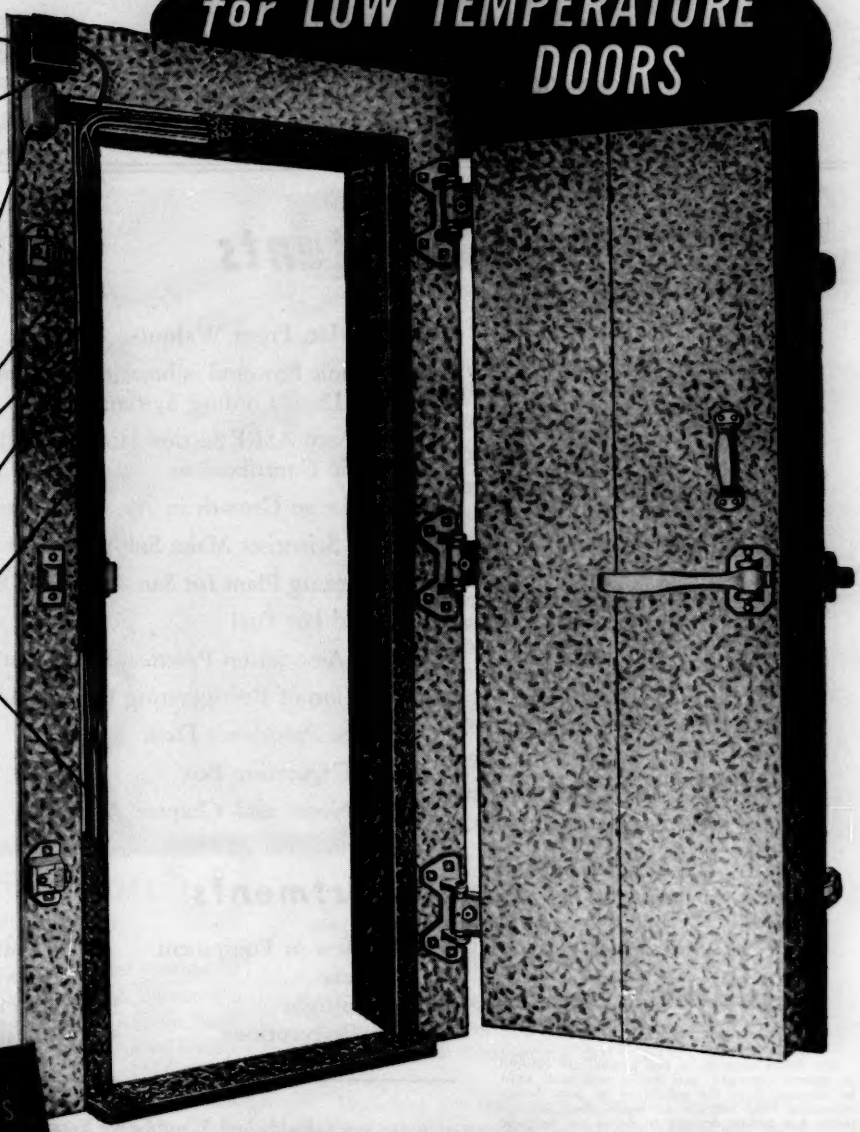
FOAMGLAS is waterproof . . . strong and rigid . . . inorganic and incombustible . . . lightweight

PITTSBURGH PC CORNING ®

Also manufacturers of PC Glass Blocks

ELECTRIC Heating Cable DEFROSTERS

for LOW TEMPERATURE DOORS



1 • Temperature adjustment control.

2 • Adjustable thermostat for range of +85° to +245° F.

3 • Steel electrical outlet box for making connection between heating element and thermostat—inlet for power.

4 • Rabbeted channels into casing.

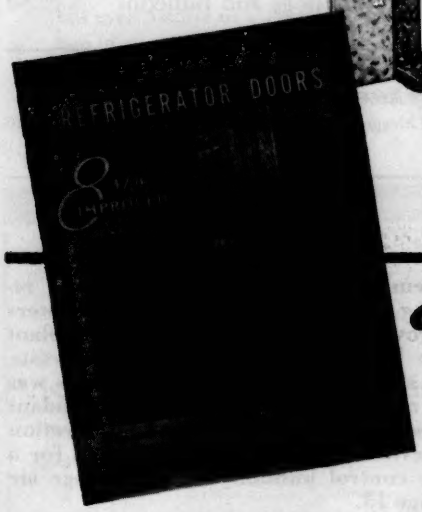
5 • Fireproof No. 26 gauge galvanized metal lined inside channel.

6 • Lead covered "heater cables" (4) held down securely by clips —approximately 20 watts to a foot. (110 volts—60 cycles).

7 • No. 10 gauge galvanized steel cover plates—removable.

8 • Capillary tube controls (on and off) thermostat.

The purpose of heating cables is to prevent icing conditions at the frame and sill areas where the door gaskets make their contact. The cables which are recessed into the frame casing are electrically heated and controlled by a "calibrated thermostat" (new improved feature by Butcher Boy), adjustable above the "dew point" of the air temperature. Since the heat expended prevents condensation it thus prevents freezing conditions.



"Butcher Boy"

QUALITY SINCE 1885

Send

FOR NEW 1957 Catalog ILLUSTRATING 8 NEW IMPROVED FEATURES

BUTCHER BOY REFRIGERATOR DOOR CO.
1000 Butcher Boy Drive • Harvard, Illinois

Gentlemen:
Send me your new 1957 Refrigerator Doors catalog

Name_____

Firm Name_____

Address_____

City_____ State_____

Industrial Refrigeration

formerly ICE AND REFRIGERATION

Now in its 66th Year of Publication

J. F. NICKERSON, FOUNDER

February, 1957

Number 2

Vol. 132

INDUSTRIAL REFRIGERATION, Vol. 132, No. 2 Published monthly at 433 N. Waller Ave., Chicago, Ill., U.S.A., by Nickerson & Collins Co. Yearly subscription in the U. S., $2.00 per year; other countries, $3.00. Single copies, 25 cents. Copyright 1956 by Nickerson & Collins Co. Acceptance as controlled circulation publication at Chicago, Ill., and Mendota, Ill.

H. T. McDERMOTT
EDITOR AND PUBLISHER

E. R. CURRY
MANAGING EDITOR

J. R. KELAHAN
TECHNICAL EDITOR

H. D. BUSBY
ASSOCIATE EDITOR

ADVERTISING

O. RHODIUS ELOFSON, DIRECTOR

EDW. DAVIESON, Representative

HELEN B. SMITH
SECRETARY

E. P. SWANSON
SUBSCRIPTION

V. S. SMITH
PRODUCTION

The entire contents of this journal are covered by general copyright, and special permission must be obtained from the publishers of same before reprinting long extracts of reproducing illustrations; but editors desiring to do so are welcome to use not more than one-third of an article, providing credit is given.

CHANGE OF ADDRESS—Notify publisher and your local post office promptly of change of mailing address to avoid non-receipt of copies. Copies incorrectly addressed, because of failure to notify publisher, cannot be replaced. Upon request, post office will provide, without cost, convenient "change of address" mailing cards.

Industrial Refrigeration is indexed regularly by Engineering Index, Inc., and is microfilmed for library use by University Microfilms.

Contents

Refrigeration From Walnuts 13

New Atomic Powered Submarine Equipped With Heavy Duty Cooling Systems 21

San Francisco ASRE Section Honors Glen Sorber For Scientific Contributions 22

Predicts Large Growth in Air Conditioning 42

Canadian Scientists Make Sub-zero Gear Tests 43

Large Freezing Plant for San Antonio 45

Ultra Cold For Fuel 46

National Association Practical Refrigerating Engineers 23

- Prevention of Refrigerating Plant Failures 23
- From the President's Desk 30
- NAPRE Question Box 32
- News Notes and Chapter Activities 35

Departments

What's New in Equipment ... 4
Press Briefs 8
In the Spotlight 11
Coming Conventions 47
Deaths 49
News of People 49
Manufacturers News 51
Catalogs and Bulletins 54

Published Monthly by NICKERSON & COLLINS CO.
General Offices: 433 N. Waller Ave., Chicago 44, Ill. Telephones: AUstin 7-1303-04-05

The Cover:

Ammonia absorption system which furnishes 500 tons of refrigeration and air conditioning at the Diamond Walnut Growers plant, Stockton, Calif. Steam provided as the energy source for plant operation is derived from the burning of walnut shells, a waste product. First cost sum of the absorption and the boiler plants was less than cost of a compression refrigerating system and its attendant housing. In addition to the absorption unit itself, the refrigeration system employs other unique devices such as glass distributors for a brine spray air washer used to control humidity in the storage air handling system. See story on page 13.

Now from Swift & Company . . .

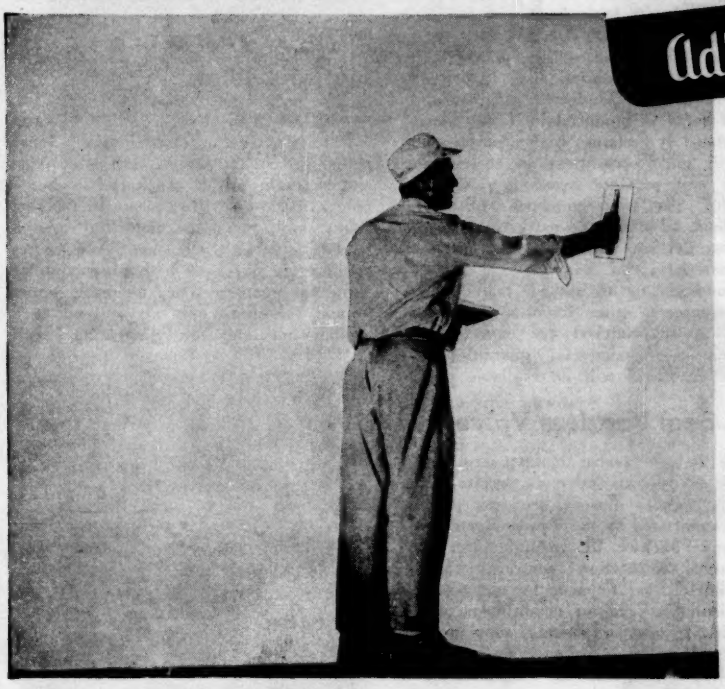
A new Concept In Wall Finishes

for

- ★ **Board Type Insulation**
- ★ **Refinishing Concrete Surfaces**
- ★ **Resurfacing Brick Walls**
- ★ **Dry Wall Construction**
- ★ **Applying Ceramic Tile**

Swift's ADCOTE

Adhesive Finish



offering these 10 ADVANTAGES

1. **WHITE SURFACE**—finished walls present a white surface.
2. **GOOD COLOR STABILITY**
3. **LOW VAPOR TRANSMISSION RATE**
4. **HIGH STRENGTH**—tensile strength exceeds that of all insulating materials tested.
5. **GOOD MOISTURE RESISTANCE**
6. **GOOD CHEMICAL RESISTANCE** to mineral oil, oleic acid and 1% alkali. Can be applied over asphalt emulsions.
7. **GOOD VERMIN AND RODENT RESISTANCE**
8. **GOOD MOLD RESISTANCE**
9. **FIRE RETARDANT**
10. **WASHABLE**—with mild detergents.

WHY SWIFT'S ADCOTE WAS DEVELOPED

Because of the need for an improved method of finishing cooler and freezer walls, Swift & Company's Research Laboratory developed Swift's Adcote. Swift has used Adcote as a finish and adhesive on insulation in many of their plants.

Insulated walls covered with Swift's Adcote tend to retain their original whiteness and give good light reflectivity.

Adcote is a two component product, a dry powder and a liquid which are mixed just prior to use. It is normally applied with a trowel although it has been successfully brushed on and sprayed on.

Contractors who have used it report lower costs due to the ease of application. Workmen particularly like its "buttering out" effect under the trowel.

However, the only way to prove the superiority of Adcote is to make a test application under your own conditions. Use the coupon below to get further information on a low cost trial order.

MAIL COUPON FOR FURTHER INFORMATION

Swift & Company
Adhesive Products Department
Chicago 9, Illinois

AD-1

☐ Send descriptive bulletin

☐ Send information on trial order

Name.....

Title.....

Company.....

Address.....

City.....Zone.....State.....

Swift

To Serve Your Industry Better

WITH THESE ADHESIVE PRODUCTS

RESINS AND RUBBERS IN EMULSION OR SOLVENT
INDUSTRIAL BONDING COMPOUNDS
DRY, LIQUID AND FLEXIBLE ANIMAL GLUES
LIQUID DEXTRIN ADHESIVES

What's New

MACHINERY
APPLIANCES • PROCESSES

New Compound For Concrete Floors

A NEW, easy-to-apply compound for new or old concrete floors that meets heavy traffic demands of industry and contains an anti-bacterial ingredient that meets the most sanitary requirements of food and dairy plants has been developed by Maintenance Engineering, 16 West Johnson Street, Philadelphia 44, Pa.

Applying Super-patch to concrete floor

The new product, called Super-Patch, prevents disintegration of floors by inhibiting molds and fungi and it effectively controls odors. It is used for patching or repairing worn or disintegrated floors and it can be used also as an armor for the topping of new concrete floors. Super-Patch hardens and densifies to provide concrete with a compressive strength of up to 10,000 p.s.i. and it provides a surface that withstands abrasion due to heavy traffic, resists the attack and disintegration of oils, grease, acids and strong cleaning compounds and provides a surface free of ruts and holes to keep traffic rolling freely. Super-Patch can be obtained in natural grey or colors. It is shipped in dry powdered form.

New Coating for Corrosion

PROFILM, a silicate modified coating has the appearance of paint, is applied by conventional spray equipment, yet will dry to the touch on most applications in a few minutes. Allied Porcenell, Inc., Waukegan, Ill., who are now marketing the new coating through a nation-wide distributor network, say that Profilm is designed for use where corrosive elements such as acids, alkalies, humidity, moisture, salt, etc. are a source of coating failure and excessive maintenance cost.

A development of a research company owned jointly by Poor & Company, Chicago and Youngstown Sheet & Tube Company, Youngstown, Ohio, Profilm is available in colors and also comes in black, clear, white and metallics — in both baking and air-dry grades. Profilm can be applied, say the manufacturers, to virtually any coatable surface including metal (ferrous and non-ferrous) masonry, wood, asbestos, etc. Because of its essentially inert composition, Profilm is said to provide a uniform, continuous and low porosity film.

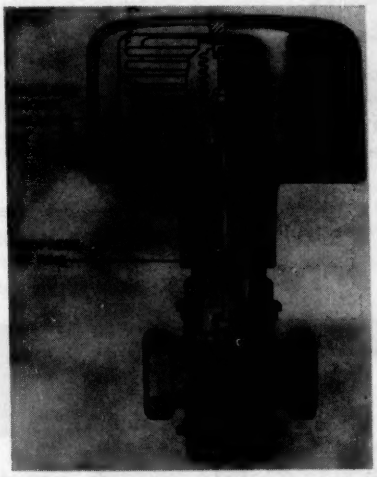
New Foam Plastic

THE development of production and market possibilities for a unique foamed styrene-and-paper "sandwich" material recently developed has been undertaken by Monsanto Chemical Company, Springfield, Mass. and the St. Regis Paper Company. In its basic form, the product, known as Fome-Core Board, consists of a core of stiff foamed styrene plastic with a sheet of specification kraft paper on either side. This "sandwich" of paper and plastic foam is produced in a continuous operation. It retains high compression strength under conditions of severe humidity and provides excellent insulation qualities. The two companies will combine their technical and marketing knowledge to develop packaging uses for the new material.

In addition to its use for manufacturing containers, other important applications for the material are expected in other fields. Commercial quantities of Fome-Core Board will be available soon.

Duo-Seal Packless Valves

FOR reduced valve maintenance and operating costs, and more precise control, the use of duo-seal packless valves are recommended by the Powers Regulator Company, Skokie, Ill:, manufacturer of automatic temperature controls. These pneumatic valves are made for convertors, unit ventilators and air conditioners, and radiators. Instead of packing, they use a bronze bellows as a primary seal, and a spring-loaded neoprene "O" ring as a secondary seal.

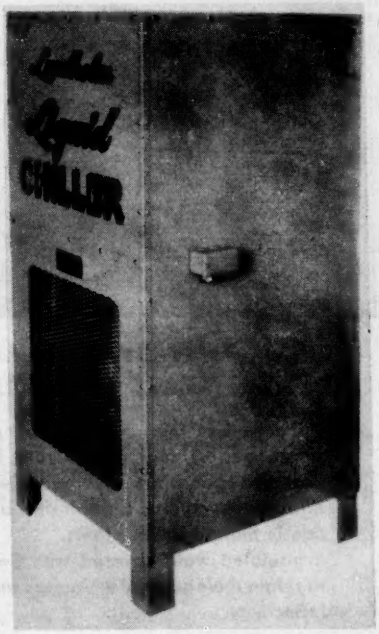


Showing Duo-seal construction of Powers packless valves. Bronze bellows serves as primary seal, and has a normal life expectancy of 10 to 15 years without maintenance. Should it become damaged, the neoprene "O" ring at its base acts as a secondary seal, effectively preventing steam or water leakage until the damaged bellows can be replaced.

The bronze bellows eliminates leakage found in conventional packed valves and requires no maintenance. In a typical gradual control system, it has a life expectancy of between 10 and 15 years, according to the company. Should the packless bellows become damaged, the neoprene ring at its base will effectively prevent steam or water leakage and vacuum loss. This permits normal valve operation until the damaged bellows is replaced. The top of the packless valve is easily removable so that the bronze bellows can be replaced without draining the water system, shutting off steam, or removing the valve from the line.

Liquid Chiller

A COMBINATION air and water cooled electric refrigerated liquid chiller for cooling liquids such as coolants and hydraulic oils is announced by Lundholm Mfg. Co., Rockford, Ill. Model shown here gives the industrial user a tandum system using water only as an auxiliary in excessive high production or extra hot weather. When operating under normal conditions only air is used as a cooling medium for dissipating heat.

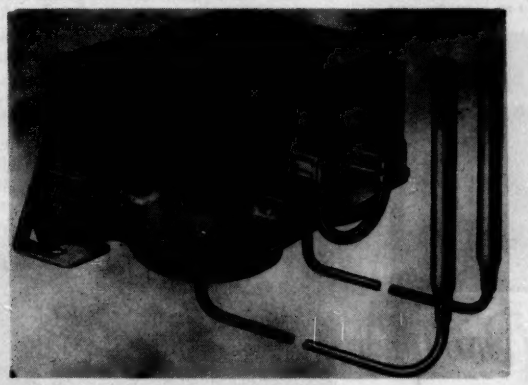


Liquid chiller for cooling liquids made by Lundholm Mfg. Co.

When pressures exceed normal operation on the air cooled radiator, water enters the system relieving excessive high pressures automatically. As pressure decreases the water is automatically shut off. This system is recommended in localities where water is scarce, or where present drain systems are used to their capacity. This chiller eliminates large reservoirs which take up expensive floor space. With properly balanced chillers, temperatures on coolants can be held to a given temperature all day long, assuring an increase in production and giving longer life to tools.

New Series Air Conditioning Controls

A NEW group of pressure operated air conditioning controls, developed and produced by Ranco, Inc., Columbus, Ohio, has been announced. "Because of their compact size, the new G models are particularly suitable for use in control panels on commercial installations," Manecke noted. "And the variety of models available permits adaptation to a number of applications."

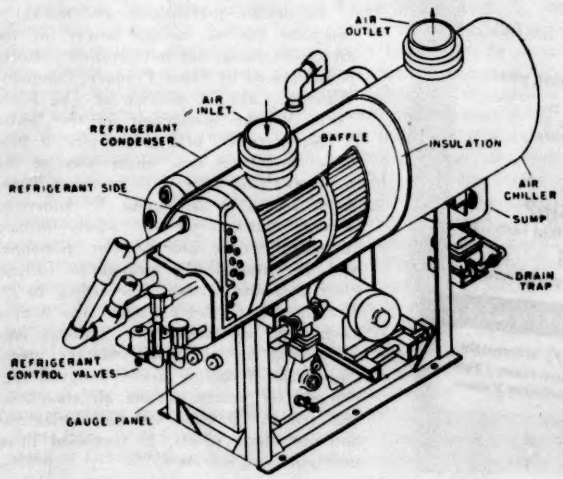


High and low-pressure Ranco G Controls mounted on single bracket and connected electrically by a jumper to effect compact dual-pressure control.

The new series includes both high and low-pressure models with automatic or manual reset; low-pressure cycling controls with differential adjustment; and dual-pressure controls. The G Control offers a choice of switch assemblies to accommodate varied applications from pilot duty of 345 volt-amperes at 230 volts to heavy duty requirements of 15.5 amperes, full load, and 84 amperes, locked rotor at 115 volts, a.c. Ranges of the new units vary from 7 to 425 psi (non-adjustable). Single-pressure models offer adjustable differentials. And all controls in the series are operated by pressure expansion type bellows, opening the contacts on a rise or decrease of pressure.

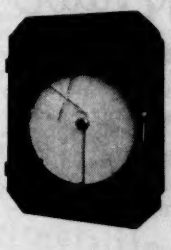
Package Air Chiller Solve Rust Problem

STEPS to reduce maintenance and increase the life of pneumatic tools by the use of high quality, dehumidified air have been taken by many automotive press and stamping plants, along with other plants using pneumatic tools in metal working operations or for general plant air supply. **(Continued on page 7)**

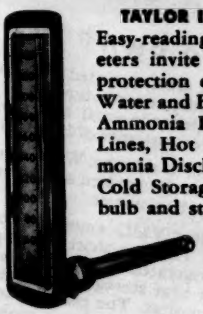


True temperature
Always accurate
Years of service
Lasting dependability
Outstanding legibility
Rugged, reliable

TAKING temperatures is Taylor's business . . . whether you want to record them or just have a clear indication of what they are . . . there's a Taylor instrument designed for the job. Just call your Taylor Field Engineer, or **write for Catalog 300.** Taylor Instrument Companies, Rochester, N.Y., or Toronto, Canada.



TAYLOR RECORDING THERMOMETER
For brine tanks, brine and ammonia lines, bunker rooms, or any process in refrigeration where temperature record is required. Available to record one, two or three different temperatures.



TAYLOR INDUSTRIAL THERMOMETERS
Easy-reading Taylor Industrial Thermometers invite frequent readings for better protection of your equipment. For Cold Water and Brine Lines, Insulated Brine or Ammonia Lines, Condenser and Water Lines, Hot Water and Steam Lines, Ammonia Discharge Lines, Brine Tanks and Cold Storage Rooms. Wide selection of bulb and stem styles and angles. Ranges: −40° to +950°F. or equivalent Centigrade. Rattle and dust-proof cases. Three-times-easier-to-read BINOC* tubing.

*Reg. U.S. Pat. Off.

NEW 6" DIAL INDICATOR
For temperature or pressure applications, where periodic reference only is required. Mercury, gas, organic liquid or vapor actuation, as desired. Variety of ranges. All new movement minimizes linkage error—gives greater accuracy throughout span. Fume and moisture proof case can be face or flush mounted.

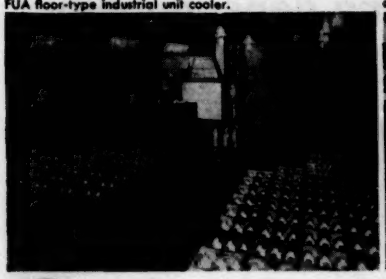
Taylor Instruments
MEAN ACCURACY FIRST

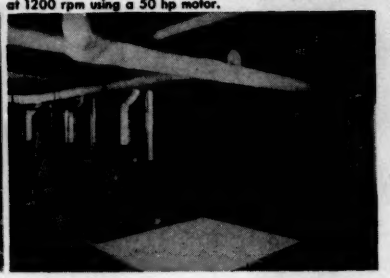
New Golden Guernsey Dairy Co-operative fluid milk plant, Waukesha, Wisconsin.

Golden Guernsey Dairy
CO-OPERATIVE

Three Vilter VMC ammonia compressors. The 20 hp, 2-cylinder unit operates at 720 rpm; one of the 4-cylinder units operates at 900 rpm with a 40 hp motor; the other at 1200 rpm using a 50 hp motor.

The 40' x 60' cooler room is refrigerated by a Vilter FUA floor-type industrial unit cooler.





Q. Why did Golden Guernsey Dairy Specify Vilter?

A. because Vilter REFRIGERATION provides high performance operation efficiently and costs less to own*

Experienced users of Vilter equipment are acquainted with its dependable performance, economical operation, rugged sturdiness . . . equipment requiring a minimum of maintenance—real cost savings over the years. Golden Guernsey is a Vilter customer of long standing.

The new Golden Guernsey plant in Waukesha, Wisconsin, operates on a 100% bulk receiving setup. The most modern equipment is used. Vilter provided the complete refrigeration system.

This system includes three Vilter VMC ammonia compressors protected by a Vilter Vapo-Riter. The two short time pasteurizers and raw milk storage tanks are refrigerated with sweet water from a Vilter 34,000 lb. ice capacity latent heat storage tank, automatically controlled by an ice thickness thermostat. The cooler room is refrigerated by a Vilter FUA 1250 floor type industrial unit cooler. A Vilter UB-90 ammonia evaporative condenser located on the roof provides 60 tons condenser capacity. This Vilter refrigeration system will provide Golden Guernsey with many years of trouble-free service.

If you require refrigeration for your plant call on Vilter for full engineering details.

We'll be at the Dairy Show, Booth B-21, and look forward to seeing you!

* Savings in low first cost are not the complete answer when considering the installation of refrigeration equipment. But savings in terms of years of extra service, reliable performance and minimum maintenance—that's where Vilter excels in low-cost ownership.

Vilter QUALITY CRAFTSMANSHIP that lasts... ENGINEERING DESIGN that guarantees performance

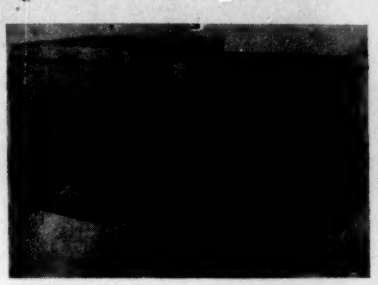
REFRIGERATION and AIR CONDITIONING

THE VILTER MANUFACTURING COMPANY, Milwaukee 7, Wisconsin

Air Units • Ammonia & Freon Compressors • Booster Compressors • Bucket Coolers • Water & Brine Coolers • Blast Freezers • Evaporative & Shell & Tube Condensers • Pipe Coils • Valves & Fittings • Pakice & Polarflake Ice Machines

New Industrial Freezer

EMPLOYING greater production capacity and rapid pull-down, the new 8 cubic foot Model WE-8-125 Webber Engineering Corporation industrial freezer is specifically designed for testing electronic components, stabilization of metals, and thermal contraction and expansion fitting. Pull-down on this unit is from ambient to minus 100 F in 30 minutes with a temperature range from ambient to minus 125 F. Four cadmium plated baskets measuring 10 x 10 x 10 inches handle the component parts. Inside dimensions are 24 x 24 x 24 inches. Outside dimension are 72 inches long x 36 inches wide x 38 inches high.



New industrial freezer for testing electronic components and expansion fitting.

Top opening lid is counter-balanced and triple sealed with low temperature gasket. Access panels allow full opening to unit compartment. Non-hygroscopic insulation is completely sealed against moisture. Refrigeration units are semi-hermetically sealed. Air cooled, water cooled or combined air and water cooled compressors are optional. A Cascade System using F-22 and F-13 eliminates the loss of refrigerant when unit is not in use. Oil-free evaporators give maximum Btu capacity. Unit operates on 440 volts, 3 phase, 60 cycle or 230 volts, single or 3 phase, 60 cycle. Other features include all welded steel construction and a lifetime interior finish.

Fluor Products Announces Line of Cooling Towers

THE formation of a separate division to design, prefabricate and market a complete line of cooling towers for the air conditioning and refrigeration industry is announced by Fluor Products Company, Whittier, Calif., a division of The Fluor Corp. Volume production on the Series 3 cooling tower, first in a series of four basic models is now under way at the company's 155 acre mill in Santa Rosa, Calif. according to Gordon M. Anderson, general manager of the newly formed division "Service and erection personnel will be strategically located to furnish close customer contact", according to O. Laurens Pratt, sales manager, who is now concluding agreements for national representation in all major market areas. The Series 3 cooling tower, designed specifically for central station air conditioning and refrigeration systems commercial and industrial plants, is furnished in a multiplicity of cell sizes.

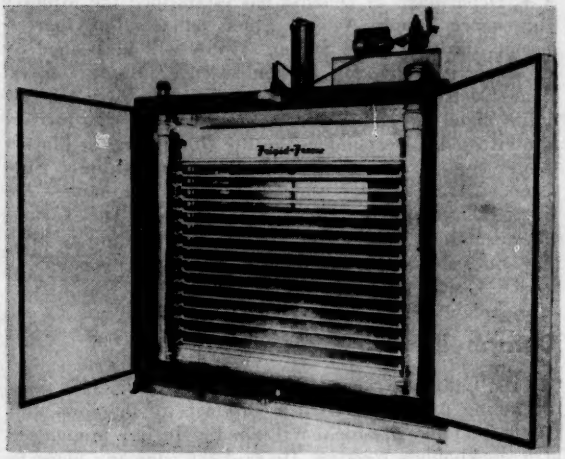
(Continued from page 5)

With the installation of Worthington Packaged Air Chillers in the press and stamping plants of the General Motors Corporation, the Chrysler Corporation, and the Ford Motor Company, the moisture content of compressed air has been greatly reduced. This has resulted in the prevention of rusting of pneumatic tools, air-powered presses, stampers, etc., as well as damage to tools from water carried through tools in the form of droplets.

The packaged air chiller is a complete refrigeration system consisting of a refrigerant compressor, motor, condenser, expansion valve and chiller. As shown in the diagram the air enters the chiller by way of the air inlet where it is then circulated through the chiller by means of baffles. As the air is refrigerated the moisture vapor in the air is condensed and drains from the chiller by way of the sump and trap. The dry or dehumidified air leaves the chiller through the air outlet and is then delivered to the pneumatic tools.

New Line of Production Freeerzs

THE nations food editors, food technologists, refrigeration engineers and publishers of Industry trade papers viewed for the first time an improved method of production freezing introduced by The Refrigeration Corporation of America which has expanded its line of production freezers which now include models and sizes for every segment of the frozen food industry.



New Frigid Food Freezer Introduced by Refrigeration Corporation of America

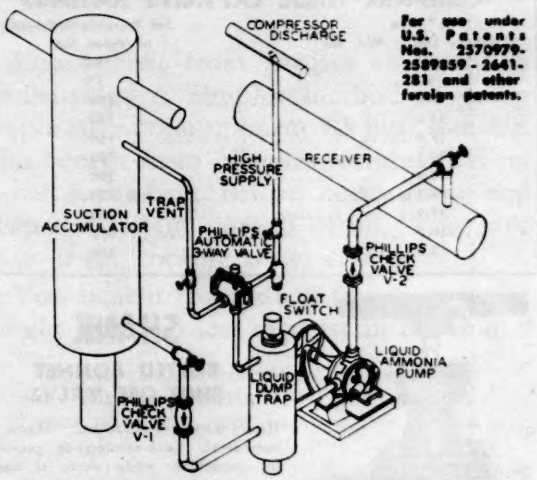
The company is now supplying Frigid-Freeze plate freezers on a production line basis in their new plant in Elizabeth, N. J. What was formerly a custom built product is now being produced on a mass assembly at significantly lower cost. In these new double contact, pressure plate production freezers an exclusive Frigid-Freeze feature eliminates difficulties experienced with unbalanced loads and problems of maintaining even schedule, freezing load per hour. This feature utilizes a new liquid level expansion valve to achieve full flooding of plates; for such models utilizing expansion valves and other exclusive features for flooded and brine systems. All Frigid-Freeze production freezers have smooth, stainless steel interiors with corners readily accessible for cleaning to conform with all regulatory health requirements. In connection with its Frigid-Freeze products, Refrigeration Corporation of America has inaugurated a Technical Service Division to assist frozen food packers in planning plant layouts. Through an associated company, the Grayson Equipment Co., Inc. manufacturers of food preparation and service equipment, the company is now able to offer a complete "Turn-Key" plan to new packers of frozen food products. The "Turn-Key" service places the responsibility of completion of a processing plant from raw product to finished packaged product in the hands of Refrigeration Corporation of America.

Ammonia "Slop-Over" Handled Automatically by PHILLIPS Liquid Return System

Protects Compressors, Saves Power, Makes Defrosting and Maintenance Simpler

Even in the best designed refrigeration systems, ammonia "slop-over" is a common occurrence. Two stage compression systems, booster systems and control ammonia compression systems subject to fast temperature and pressure changes are especially likely to have liquid in suction lines. This condition can seriously damage compressors which should handle dry gasses only.

Engineers at H. A. Phillips & Co. have devised a system that automatically returns "slop-over" directly to the receiver without regenerating and re-condensing the liquid. As shown in the drawing below, the Phillips Liquid Return System takes liquid ammonia which has collected in the accumulator, drains it through an outlet valve and check valve (V-1) into a liquid trap. Drainage occurs when the trap is at a low pressure. The trap is vented to the accumulator through a three-way valve and vent line. As the trap fills, a float switch is activated, energizing a three-way valve. This valve closes the vent line and connects the compressor discharge to the trap. Pressure builds up in the trap and closes check valve V-1. Pressure in the trap then reaches the same pressure as the receiver, opening check valve V-2 and allowing gravity to carry the liquid to the receiver. If gravity flow is not possible, a liquid ammonia pump is used. High pressure at both the pump inlet and outlet prevents flashing the liquid into gas. When the liquid trap is empty, the three-way valve is de-energized, closing the high pressure line to the trap. The trap is again vented to the accumulator, allowing liquid to drain once again into the trap.



Phillips Liquid Return System

This arrangement is highly efficient since only one pound of compression gas is required to move 25 pounds of liquid. There is practically no loss of refrigeration potential of the recovered liquid. The system also permits oil flushed into the accumulator to be easily drained.

A number of "packaged" variations of this system in capacities to 1000-tons are available to handle all arrangements of accumulator and receiver locations. For full details, write . . .

PHILLIPS

H. A. PHILLIPS & CO.
DESIGNERS AND ENGINEERS
REFRIGERATION CONTROL SYSTEMS
3255 W. Carroll Ave. • Chicago 24, Illinois

SHANK
AMMONIA
VALVES

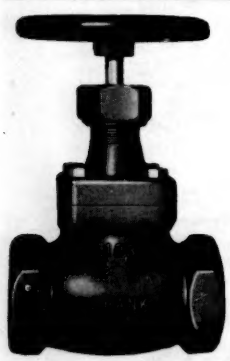
Engineered for Accuracy and Built for Dependability

SHANK
RELIEF VALVE ASSEMBLY

Petro Unions for ease of replacement. In the event of an emergency, the 3-way valve can be opened half way allowing both relief valves to function. ½" size certified by N.B. and A.S.M.E.

COMPARE THESE CAPACITY RATINGS

½" size Capacity Lbs. / Min. Air	Set Popping Pressure of Valve Lbs.
6.9	50
9.6	75
12.3	100
15.0	125
17.6	150
20.1	175
22.8	200
25.4	225
27.9	250
30.5	275
33.0	300



SHANK
BOLTED BONNET SHUT-OFF VALVE

Heavy-duty construction. Made of semi-steel. Back-seating is provided for repacking while valve is under pressure. Seat is made of soft metal alloy-swivel and self-aligning. Ample ports provide full-pipe capacity. Hand wheels proportioned for easy operation.

IMMEDIATE DELIVERY ON OUR COMPLETE LINE
Send for catalog.

CYRUS SHANK COMPANY

4650 West 12th Place, Chicago 50, Illinois

PRESS BRIEFS

New Ice Rink Planned For Yale University

THE YALE Corporation has approved plans for the new Yale hockey rink. The rink was designed by Eero Saarinen, a noted architect who got his bachelor's degree at Yale in 1934. Construction will begin in the spring, according to A. Whitney Griswold, president. The rink will rise at Sachem and Mansfield Streets in the midst of the university campus.

A large part of the $850,000 cost of the rink already has been given by members of the Yale Hockey Association and friends. The rink will accommodate 3,000 spectators at hockey games, and up to 5,000 for assemblies not requiring an ice surface. Yale officials hope the rink may open for the winter season of 1957-1958. An arch running the length of the building will support an aluminum roof suspended by cables and thus permit the interior to be free of obstructive posts.

Military Subsistence Supply Agency

AS A PART of its Single Manager Supply System, the Department of Defense has established the Military Subsistence Supply Agency which replaces the Quartermaster Market Center System. MSSA will be headed by an Executive Director for Subsistence, Major General Henry McKenzie who was expected to take over his new duties about December 15. NARW members who formerly addressed correspondence to the Quartermaster Market Center System now address Headquarters, Military Subsistence Agency. The address remains the same—226 West Jackson Blvd., Chicago 6, Illinois. The various Quartermaster Market Centers are now known as Military Subsistence Market Subsistence Market Centers.—NARW Quick Sheet.

Campbell Soup Expands

THE Campbell Soup Company, Camden, N. J. is marketing or testing 16 new products in the soup and frozen food line, president William B. Murphy announced at a stockholders meeting. He said the company plans to spend $30 million during the 1956-57 fiscal year in building new plant facilities and enlarging existing ones.

Murphy told the stockholders not to expect immediate gains from the expansion program, saying that "sizable profits follow development work and are not usually concurrent with them." He said sales for the last fiscal year were up 14 percent and earnings were at the highest level in the company's history. "In the last five years we have not raised our general price levels on our principal products," he said.

New Fruit Processing Plant

A NEW $500,000 fruit processing and cold storage plant is to be constructed at New Orleans, La. by Vincent A. Guercio who, with his father, Rosario Guercio, operates the firm of R. Guercio & Son, Inc. The site, purchased from the Texas & New Orleans Railroad, was formerly occupied by the Bienville warehouse, destroyed by fire in 1941. Construction will start immediately and should take about nine months, Guercio said. The plant will handle the processing of bananas and tomatoes for sale and shipment.

American Warehousemen's Convention

PLANS for the 66th annual convention of the American Warehousemen's Association, April 1-5, Chalfonte Haddon Hall, Atlantic City, New Jersey, were announced at Washington when the "Official Call" to the Convention was issued to all members by the AWA headquarters office. Millard Young, general president of the AWA, stated that over 800 refrigerated and merchandise warehousemen from all sections of the nation are expected to attend the four-day meeting. Meeting jointly will be AWA's two divisions, the National Association of Refrigerated Warehouses and the AWA Merchandise Division.

The program will include individual divisional business sessions, with the refrigerated warehouse sessions under the chairmanship of Gilbert J. Stecker, NARW president, Louisville, Ky., and the merchandise warehouse sessions under the chairmanship of C. J. La Mothe, AWA Merchandise Division president, St. Louis, Mo.

Arrangements for the meeting are being made by AWA General Headquarters, Tower Building, Washington 5, D. C. General Convention Chairman is Horace W. Wilson, of Philadelphia, Pa.

New Houston Milk Plant

OAK FARMS Dairies of Dallas has purchased land for the construction of a Houston plant costing approximately $1,000,000, H. E. Hartfelder, president, has announced. The plant, one of the largest in the Gulf Coast area and the most modern in the Southwest, will be situated on an 8.6-acre tract on the Gulf Freeway, near Gulgate Shopping City. M. M. Palmer, Houston, division manager, said construction is scheduled to being early in 1957 and completion expected within 18 months. With an initial capacity of 120,000 quarts of milk daily, the plant will rank among the city's largest dairies, Palmer said. The building will be constructed to permit expansion to a capacity of 240,000 quarts daily.

Iceman Wills New York $20,000

A BROOKLYN iceman, who came to New York from Italy 50 years ago, has willed $20,000 to New York City "in grateful appreciation for the opportunities the city gave me during my lifetime."

Gennaro Sorrenti, known to many of his customers as "Jimmy the iceman" and "Jimmy the gentleman," died in 1953 at the age of 68. His will, approved for probate January 8, left a three-family house in Brooklyn and some stocks—valued at a total of $20,000—to the city. Another $5,000 in assets was bequeathed to relatives in Italy. Sorrenti's wife died about 10 years ago. He operated his ice business from a cellar he rented for $5.00 a month, and resided in the basement of the house he owned—renting out three apartments.

Symposium on Storing Food

A SYMPOSIUM on future developments in food preservation, sponsored by the Midwest Research Institute, will be held at the Hotel Muehlebach, Kansas City, Mo. April 2 and 3. William W. Niven, Jr., manager of the chemical engineering division at the institute and chairman of the symposium, said topics to be covered include refrigeration, dehydration, heat sterilization, irradiation, and chemical preservation. Aspects of food preservation in relation to public health, nutrition, economics and home economics also will be studied.

With this new, sectional design Niagara condenser you avoid the many troubles due to faulty condensing and get at all times the full capacity your refrigerating plant should afford.

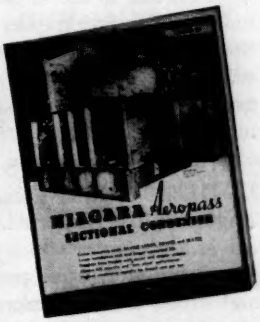
You benefit from extra saving in upkeep labor and expense. The casing of this new condenser is made of sections each separately removable, giving you access to all parts for easy inspection to head off dirt and corrosion, to clean the coils easily from either side.

You benefit from greater efficiency in condensing. A simpler method of using evaporative cooling improves heat transfer. You benefit from Niagara features that remove super-heat before condensing and keep the system purged of oil. You save 95% of the cooling water cost.

You benefit from a low first cost, lower freight cost and less expense in erection.

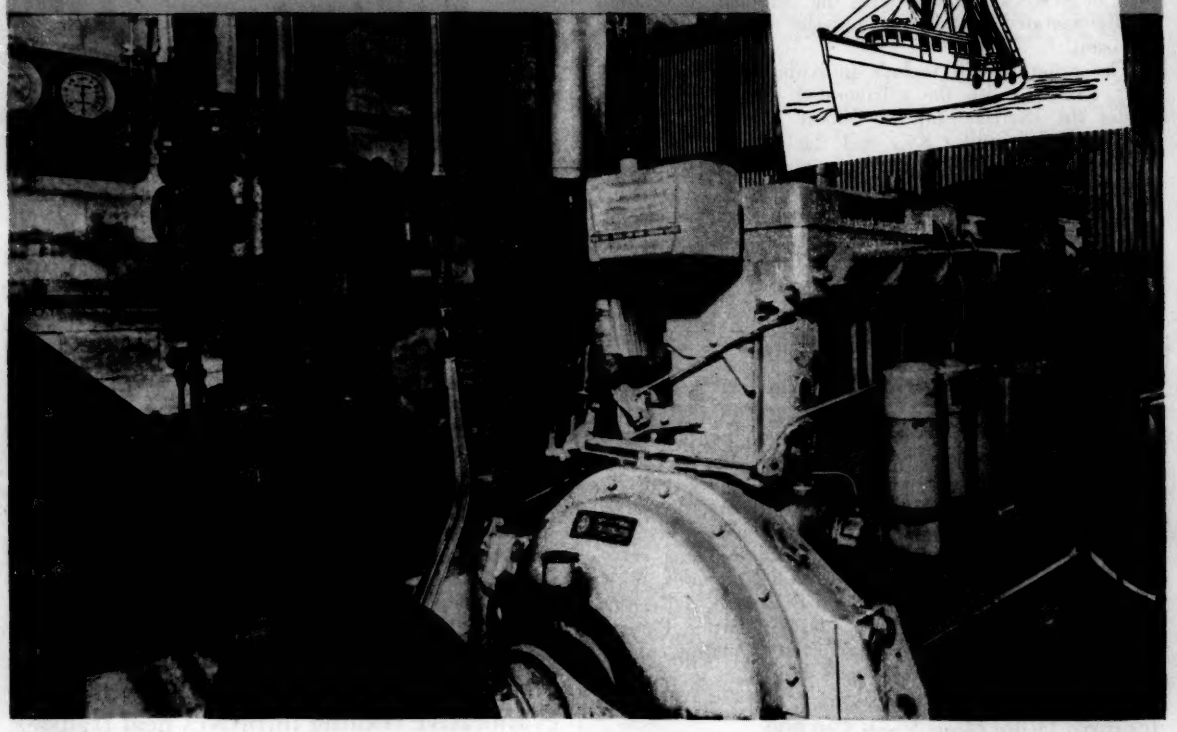
Capacity range is from 60 to 240 tons. Write for Niagara Bulletin 131. Find out how your plant can save expense this season.

NIAGARA BLOWER COMPANY
1. R., 405 Lexington Avenue
NEW YORK 17, N. Y.
District Engineers in Principal Cities



NIAGARA Over 40 Years' Service in Industrial Air Engineering

SAME DEPENDABLE CAT* POWER
in shrimp boats and ice plant



J. L. Stovall, of Fernandina Beach, Florida, operates the Fernandina Ice Co. plant, supplying 35 tons of ice per day to shrimpers and townspeople. He also owns four shrimp boats. Both the ice plant and the shrimpers are powered by Cat Engines.

Says Mr. Stovall: "We got such good service from Cat Diesels in our boats that we bought a Caterpillar D13000 to power the ice plant. If there's a better engine built I'd like to see it. We had one engine of another make in a shrimp trawler and we'll never buy another. Since then we've bought all Caterpillar Diesels, and will in the future when we need engines. They do a good job under heavy load conditions, 24 hours a day, month after month."

Two of the shrimp boats in the fleet are powered by D13000 Marine Diesels and two have Cat D337 Engines. The Caterpillar Engine in the ice plant drives a generator which powers the air blower, water pump, agitator, brine pump, crusher and all lighting, and drives a 9 x 9 compressor.

It's natural to turn to Caterpillar power for refrigeration. There's rugged dependability built into Cat Engines, whether for marine or industrial use. Furthermore, Cat Engines are easy to take care of. Their simple fuel system and dependable four-cycle design keep them on the job with a minimum of attention. They have no cylinder ports or air boxes to clean.

Your Caterpillar Dealer has a whole new line of Cat Diesels, which can produce up to 650 HP (maximum output capacity). And he backs their long, economical work life with round-the-clock service and parts. Call him today.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

MODERN HEAVY-DUTY POWER

In the Spotlight

A NEW and modern plant for the storage of walnuts has been built near the center of walnut production in California by the Diamond Walnut Growers, Stockton, Calif. A unique feature is that ground-up walnut shells have an important industrial use in making automatic transmissions shift smoother. The main production areas, the offices, the cafeteria and laboratories are all air conditioned. Storage of walnuts are on a palletized warehousing basis. For detailed description of this plant and the air conditioning system see article starting on page 13.

THE NEW atomic-powered submarines require not only heavy duty cooling equipment for air conditioning, but also for continually revitalizing the atmosphere inside the ship. The USS Nautilus and USS Seawolf each have refrigeration plants of 240 tons. The air cooling and purification system of the Nautilus is described in the article on page 21.

CANADIAN SCIENTISTS are engaged in research on problems in industry created by subzero temperatures. One development is a special oil which can be used to lubricate machinery at temperatures as low as 65 degrees below zero. For further details see page 43.

THE THEORY that a new type of super atomic energy can be released by making atoms extremely cold instead of hot will be explored by The United States Air Force. If this can be attained, according to the originator of the concept, the velocity of light can be exceeded by a rocket. For brief discussion of this theory, see page 46.

LEAD OFF paper for the 1957 NAPRE series on "Prevention of Refrigeration Plant Failures", makes its appearance this month on page 23. The role of the Chief in training and instruction of plant personnel is emphasized, subtly. The topic deals directly with his responsibility in breaking in new machinery, but points out that an operating manual for his plant can contain the necessary instructions for his assistants. Subject manual serves as text for in-plant training and as a source for instructions.

A NEW INSULATION resistance testing device was described at a meeting of the Washington Chapter NAPRE. The report, presented by R. K. Schumacher, maintenance specialist for General Electric, detailed its uses on high voltage equipment, and explained that with this type of tester it is possible to more accurately determine the life of the wiring within the motor and as high tension is used, a more accurate reading can be made. See page 41.

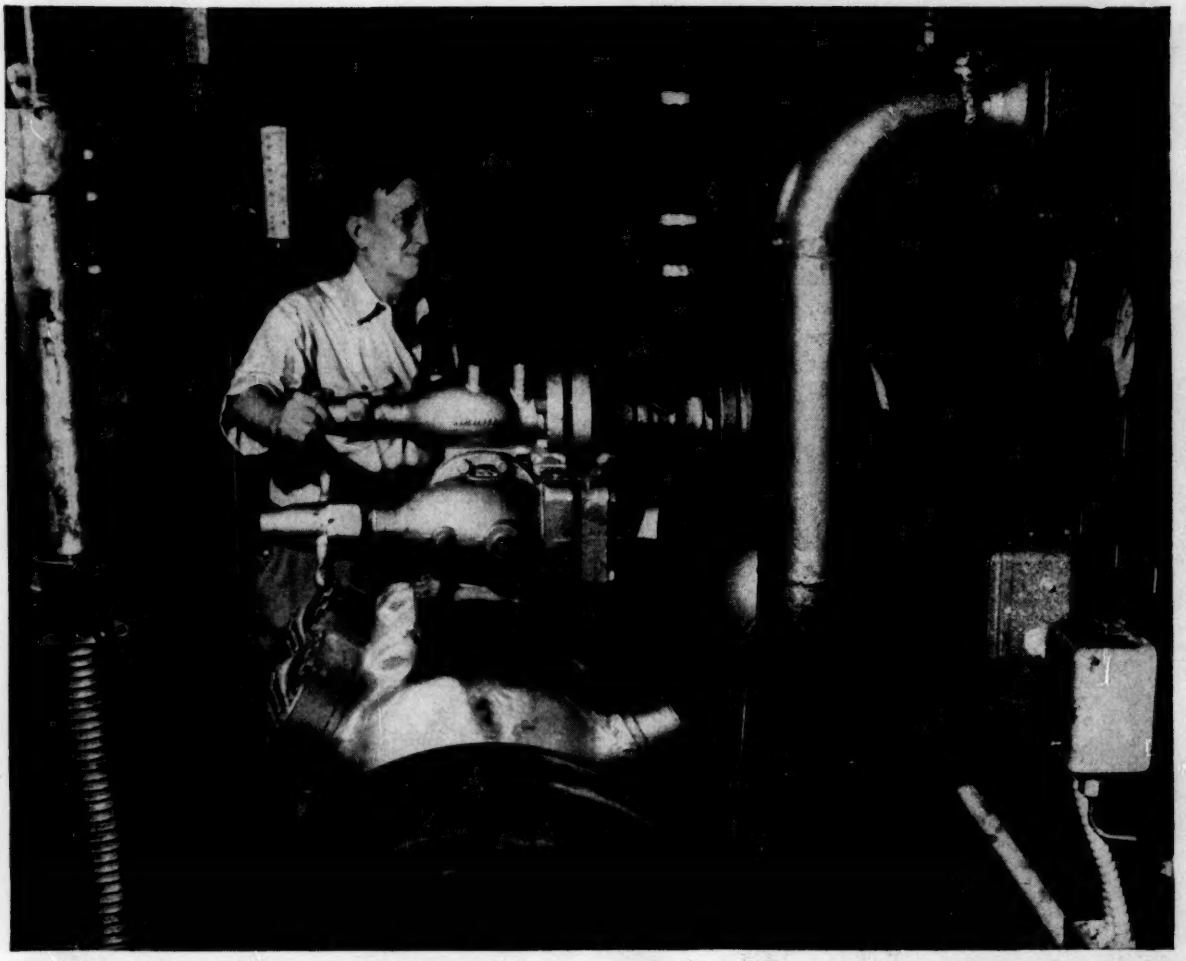
AIR CONDITIONING is facing good prospects of breaking all sales records in 1957, according to a leading air conditioning executive. He predicts that home, commercial and industrial use will push the retail volume to three and a half billion dollars. Five years from now, in 1961, this figure will climb to a five billion dollar level. See outline of his views on page 42.

KEEPING ICE off vestibules and auto-close doors is a problem in many refrigerated warehouses and freezer plants. Read how one firm solved the problem in Question 1153, Page 33.

PRE-PACKAGED Frozen meats are increasing in acceptance. An informal survey produces the following: An executive of a large meat packer is reported to have stated that in ten years time 90 percent of all fresh meat will be sold in the frozen form. A National Tea Company vice-president has predicted that in three years frozen meat sales will be 30 to 35 percent of all meat sales, and 50 percent in five years. A survey by the Toledo Scale Co. to estimate future sales of frozen meat shows that frozen meats will represent 22 percent of all meat sales by 1960. In another survey, housewives were asked if they would buy prepackaged frozen meats they could not see. 65 percent said "yes", according to reports.—NARW Quick Sheet.

MORE PEOPLE in the world with refrigerators has led to a proposal for beginning international standards work in refrigeration. American Standards Association has offered to take responsibility for the project now being organized through the International Organization for Standardization. Aim in this: Whether it's the Frenchman or the Aborigines who buys an imported refrigerator, an international set of rules, terminology and tests can insure him he'll get a fair deal for his francs or his kangaroo hide. Plan will benefit manufacturer as well.

PRECOOKED frozen foods are being sold by the Howard Johnson restaurant chain in increasing volumes. The concern entered the frozen food field in 1953. The company packs and freezes, under its own label, 19 of the more popular dishes which are consumed in the more than 550 Howard Johnson restaurants. Approximately 1,250,000 pounds of frozen foods in retail packages were packed and marketed by the company last year.



"Where my job depends on effective air conditioning, I want 'Freon'* in the system"

... SAYS VETERAN OPERATING ENGINEER E. K. PETERSON

"In the film business, where the cost of minutes is figured in thousands of dollars, air conditioning failures cost plenty," says Mr. Peterson, operating engineer at Production Center, Inc., of New York. Production Center is the world's only completely air conditioned movie and TV studio. "That's why I'm glad our twin 100-ton Carrier units are charged with a Du Pont 'Freon' refrigerant.

"I've used 'Freon' refrigerants ever since they came out more than 25 years ago," Mr. Peterson adds. "I've never had any trouble with them. They're completely dependable."

You'll find Du Pont "Freon" refrigerants superior for any installation. "Freon" is dry and pure, noncorrosive, nontoxic, nonflammable. It's available when you need it from your complete air conditioning and refrigeration wholesaler.

FOR INFORMATION on the use and handling of "Freon", or for the location of your complete air conditioning and refrigeration wholesaler, write: E. I. du Pont de Nemours & Co. (Inc.), "Kinetic" Chemicals Div. 261, Wilmington 98, Del.

Always ask for "Freon" where you see this sign . . .

DU PONT
REG. U. S. PAT. OFF.

FREON

KINETIC

REFRIGERANTS

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

*"Freon" is Du Pont's registered trademark for its fluorinated hydrocarbon refrigerants.

Refrigeration From Walnuts ??

WARREN B. LUDWIG
York Corp. Subsidiary
Borg-Warner Corp.
San Francisco

NO, the title above is neither an editorial faux pas, nor a typographical error! Refrigeration does enhance the storage of walnuts[1], and walnut by-products (shells) are an excellent energy source for power which produces that refrigeration. Hence, "Refrigeration from Walnuts".

THE Diamond Walnut Growers Inc., formerly the California Walnut Growers Ass'n., now located in Stockton, is the enterprise employing this seemingly paradoxical innovation. In 1953, this Association, growers and marketers of the famous "Diamond" brand, was faced with two troublesome facts. First, walnut production had increased to a point where their 28-year-old Los Angeles production and storage facilities could scarcely cope with it. Furthermore, the Los Angeles facility was split into two operations in different parts of the city and this in itself was an uneconomical arrangement.

The original facilities were built in Los Angeles primarily because Southern California was the center of walnut acreage in California. The tremendous population influx to California during World War II and after, caused diminishing of Southern California acreage as cities expanded and new towns formed. This brought about the second troublesome fact that had to be faced. The center of walnut production was now and obviously would continue to be in Northern California.

[1]Walnuts, Persian or English variety; TRRF Commodity Storage Manual.

WALNUT shells have an important industrial use, in making automatic transmissions shift smoother, it is pointed out in a "Believe it or Not" advertisement of the Borg-Warner Corp. It says: "To polish vital parts of B-W Automatic Transmissions, they are blasted with ground-up walnut shells, Unlike most abrasives, shells won't scratch, yet they take off burrs, rough edges and give a high sheen. Such polishing makes sure valves, gears and other parts will move freely, act instantly, to insure the smooth shifting for which B-W automatics are famous.

In 1954 it was decided that the only solution was to build a new and modern plant in which all of the production and storage facilities could be combined, and to locate it near the center of walnut production. Stockton, California, was decided upon as the best location since it is close to the geographical center of walnut production. The city also has excellent rail and port facilities.

The "Diamond" Walnut Growers then retained Utah Construction Co., San Francisco, to design and build the new facilities. With the assistance of Benson Eschenbach, architect, and the firm of Vandament & Darmsted, consulting mechanical and electrical engineers, Utah Construction Co. put the "Diamond" plan into operation. The new Stockton plant was dedicated in August, 1956, at which time about one-third of the production had been moved to the new location.

Plant Building Description

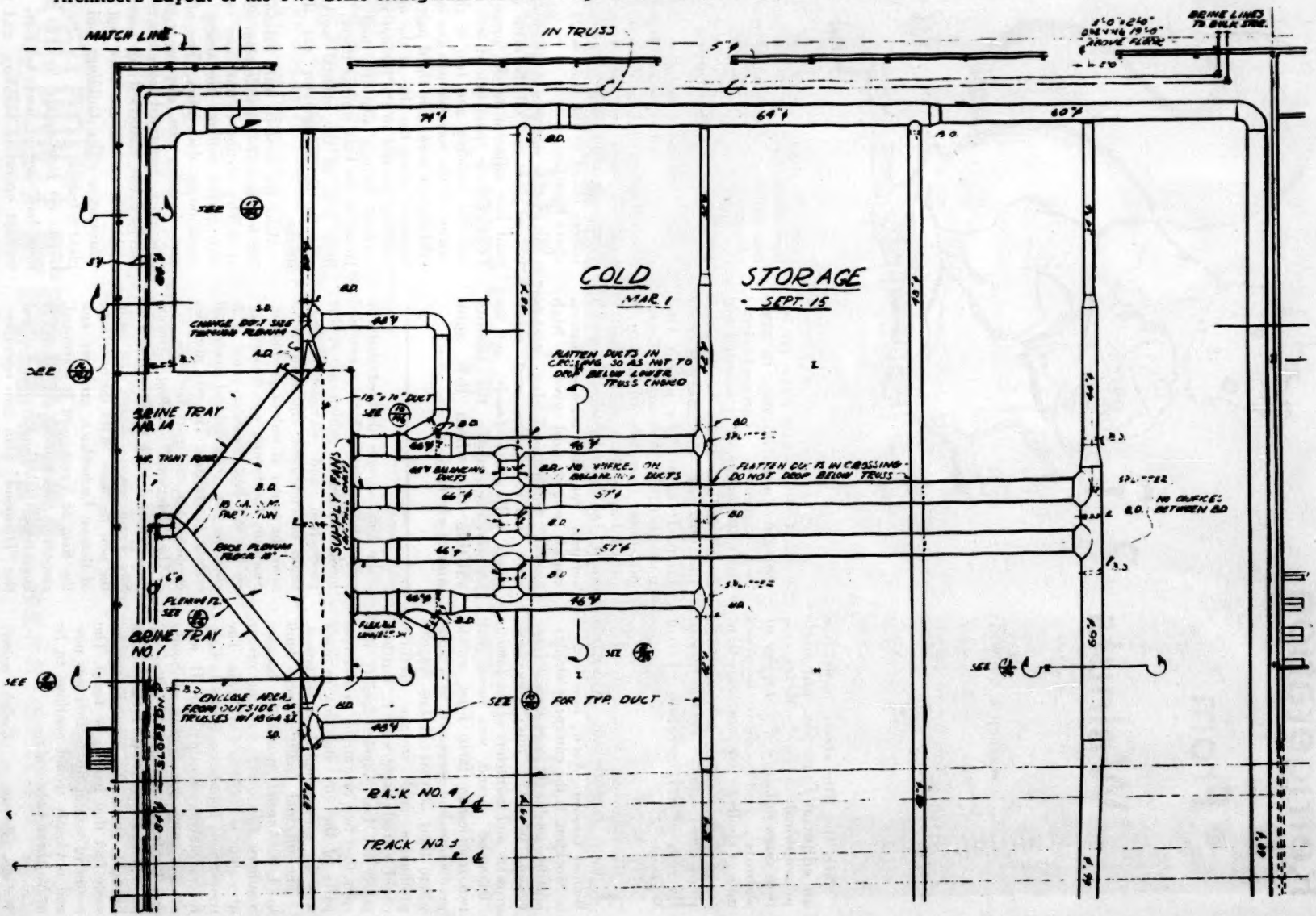
Main processing building at the new site is 720 feet square. It is constructed of tilt-up concrete walls and roof supported by steel truss on columns at 60 by 80 feet centers. The bottom chord of the truss is 21 feet above floor line.

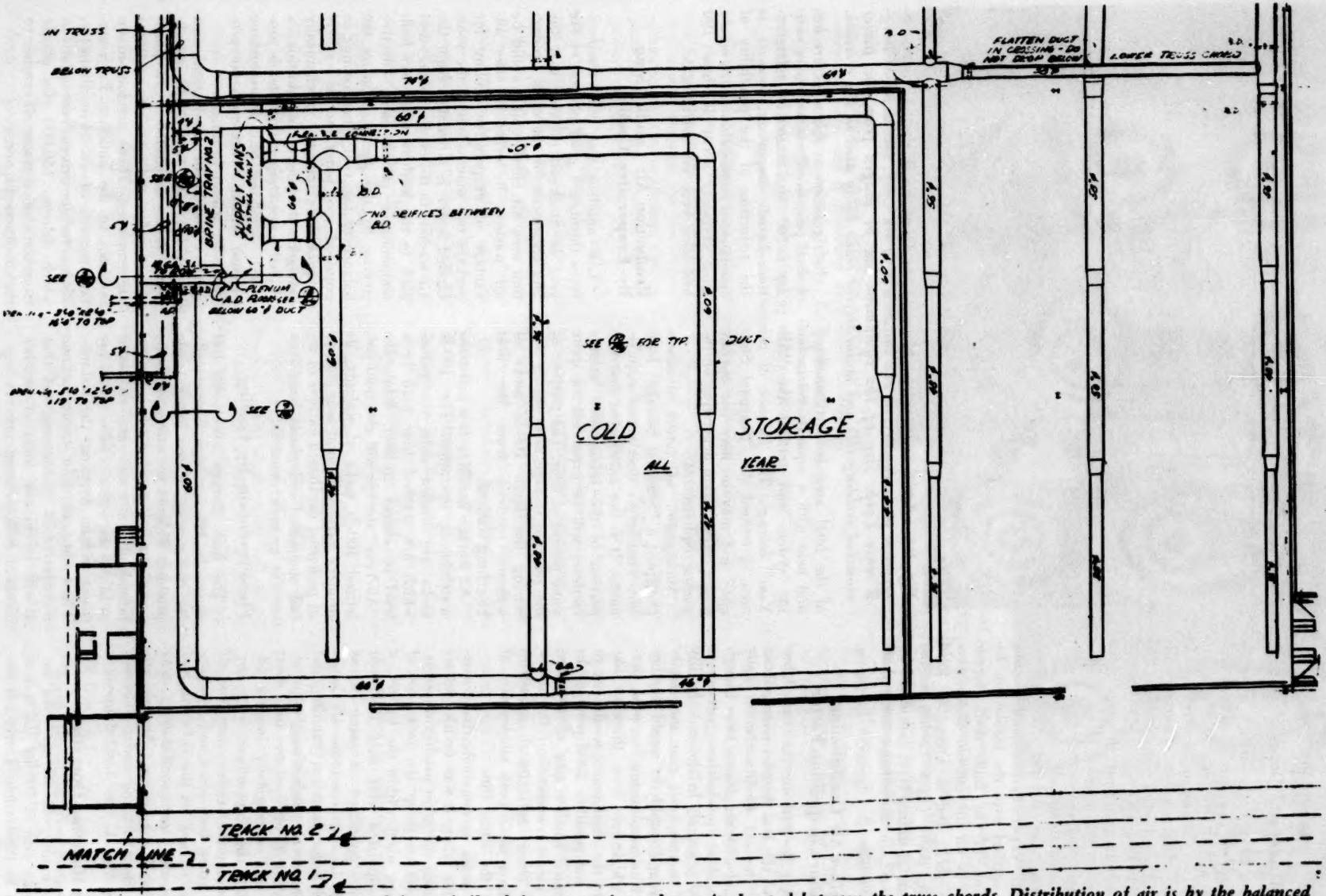
Six double spur tracks which service the plant peel off the main railroad line adjacent to the property. Four of these spurs extend 600 feet into the building and two of them extend all the way through the large cold storage area. The third pair are arranged along the side of the main building parallel to the 50-foot wide covered loading platform and adjacent to the bulk storage tower. The floor level of the general working area is at refrigerator car door height.

Along the western wall, extending 700 feet, is a 32-foot wide plant office area. This section is one story only, with furred ceilings containing air conditioning duct work. The office area includes the dispensery and laboratory. Separated from the main building but connected by covered walkways, are the executive and administrative office buildings and the plant cafeteria.

The 80 feet square by 110 feet high bulk storage tower and its attendant operating building, and the 40 feet square by 60 feet high walnut

Architect's Layout of the Two Brine Refrigerated Air Duct Systems in the Storage Areas at Diamond Walnut Growers, Inc., Stockton.


MATCH LINE
IN TRUSS
BRINE LINES TO BRINE STOR.
COLD STORAGE
MAR. 1 - SEPT. 15
BRINE TRAY NO. 1A
BRINE TRAY NO. 1
SUPPLY FANS
FLATTEN DUCTS IN CROSSING SO AS NOT TO DROP BELOW LOWER TRUSS CHORD
FLATTEN DUCTS IN CROSSING - DO NOT DROP BELOW TRUSS
NO ORIFICE BETWEEN B.D.
ENCLOSE AREA FROM OUTSIDE OF TRUSSES W/ 18 GA. S.I.
SEE FOR TYP. DUCT
TRACK NO. 4
TRACK NO. 3


IN TRUSS
BELOW TRUSS
FLATTEN DUCT IN CROSSING - DO NOT DROP BELOW
LOWER TRUSS CHORD
BRINE TRAY NO 2
SUPPLY FANS (4 TOTAL UNITS)
NO ORIFICES BETWEEN B.D.
PLENUM A.D. ROOF SEE BELOW 60"ϕ DUCT
SEE FOR TYP. DUCT
COLD STORAGE ALL YEAR
TRACK NO. 2
MATCH LINE
TRACK NO. 1

Two principal storage spaces are refrigerated from similar brine spray air washer units located between the truss chords. Distribution of air is by the balanced system shown. Return air is picked up by more ducts at outside perimeters.

shell storage tower are the two buildings that complete this plot plan.

Insulation and Doors

Insulation of the storage structure consists of two layers of two-inch thick asphalt enclosed Fiberglas applied to the tilt-up concrete walls with asphalt emulsion. Interior walls are of steel stud construction and the AE Fiberglas board was erected free-standing against the studs. No insulation was applied to the floor.

Roof insulation consists of Fiberglas two-and-one-half inch thick roof decking and one-inch thick fiberboard. Vapor barrier and roofing was applied over the insulation. Insulation of the bulk shell storage tower is on the outside of the concrete shell, and is Foamglas. Cold storage doors (12 x 12 ft) are the horizontal sliding type, fabricated by Diamond in accordance with their own design.

Comfort Air Conditioning A Labor Competition Factor

Being located in the vast labor pool of the Los Angeles metropolitan area, the old facilities were easily manned with employees even though the walnut production pattern is highly seasonal. In the new facility it is contemplated that the steady year-round employees would number 600. However, during the peak periods which last from three to five months the employment would rise to 2600 and possibly 2800 persons. In the much smaller city of Stockton this meant competition for labor since other agricultural industries also have their peak employment at about the same time.

In order to more effectively compete for labor, it was decided to air condition the main production areas. However, to keep the first cost of the new plant within the budget, it was stipulated that only the most densely populated working areas would be air conditioned. Consequently, the cracking, canning and bagging areas which occupy approximately 30 percent of the total floor area, and strategically located adjacent to the plant offices, were considered for air conditioning. For all office areas, both plant and administrative, as well as the cafeteria and laboratories, air conditioning was considered mandatory. An absorption system pictured under construction in Fig. 1, was decided upon.

Pallet Handling Operation

The main cold storage area occupies an area of 300 by 400 feet as shown in illustration. Thirty percent of the total area is partitioned off and held with a separate refrigerating system and termed the "All-Year" storage. The balance of the area is termed the "Seasonal Storage" and may or may not operate under refrigeration depending on the season requirements.

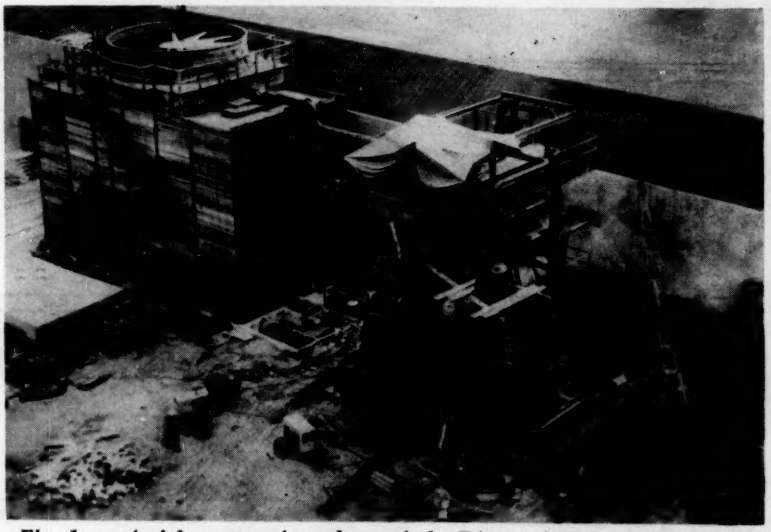


Fig. 1 — Aerial construction photo of the Diamond Walnut Growers absorption plant engineered and installed by York Corp. subsidiary of Borg-Warner Corp. Size of the equipment can be judged from the trailer mounted welding sets and motor-tractor crane being used in the erection.

Anticipation of future demands prompted a "Seasonal Storage" built somewhat larger than actual requirements. It is not anticipated that this portion of the refrigerated storage facilities will be expanded for quite some period of time. The purpose of the seasonal storage is primarily for storing the large 100-lb sacks of walnuts received from the field bleaching stations.

All storage handling is a palletized warehousing operation. The 100-lb sacks are loaded onto the pallets which are stacked four high to a level of almost 20 feet. While the "All-Year" storage will also hold palletized 100-lb sacks of walnuts, its primary purpose is short-time storage of palletized cardboard cartons of retail one-pound cellophane bags seen on the grocery counters.

Fire-Prevention By Cooling

The bulk storage tower, 80 feet square by 100 feet high, is essentially for the storage of the lower grade product. Walnuts are conveyed to the top of the tower and discharged into helical chutes which are employed to fill up the series of silos within the tower without breaking the walnuts. When additional cold storage volume is required it is contemplated that it will be in the form of another identical bulk storage tower.

Refrigeration in this structure has a dual purpose. Preservation in storage is the main reason for refrigeration. Equally important, however, is the reduction of the possibility of spontaneous combustion which would most certainly occur if these 100 foot silos were not refrigerated.

Production Air Conditioning By Evaporative Cooling

Low ambient wet bulb temperatures through a good portion of the year at Stockton, dictated that the best treatment for the main production area air conditioning would be air washers in order to take advantage of evaporative cooling for perhaps two months out of the year. Chilled water is circulated from the air washers to the cooling towers and back to the washers when wet bulb temperatures permit most effective cooling by this means. During the balance of the year when cooling is required, cool water for the washers is provided from the mechanically refrigerated chillers. In addition, a chilled water tempering heater is provided, supplying heat from turbine exhaust steam. Steam coils are provided for winter heating.

Since the main production area is divided into two approximately equal rooms separated by a partition, two fan and air washer stations are employed. These are located on the roof of the building. Each station consists of an 84-in. diameter, 75 hp, turbine-driven vane-axial fan which delivers 140,000 cfm of air from the chilled water air washer to the conditioned space.

Fig. 2 — Plenum chamber, brine air washer, two 25 hp vane-axial fans, and distribution duct work located in truss work above seasonal storage. Each fan has a capacity of 50,000 cfm and is 54 inches in diameter. Distribution of the air is accomplished by nozzle-like apertures in the round ducts.

Fig. 3 — Interior view of plenum for brine air washer system No. 1. Air is drawn from the room serviced and passed over two brine trays, arranged in plan in V-shape. One tray of ribbed glass brine distributor plates is visible at the extreme left. This conditioned air is then drawn into the vane-axial fans at the right.

The air circulation system consists of round duct located within the truss space above the bottom chords. Air returns through the conditioned spaces to the suction plenum, and by-pass dampers are provided for humidity control.

Plant offices, dispensery and laboratory are split into four zones each handled by an individual chilled water air handling unit. Individual offices of the administration area are handled by means of chilled water fan-window units, and the large accounting offices by means of a central station chilled water air handling unit located on the roof of the building. This unit also provides air conditioning for the cafeteria.

Refrigeration Air Cycle Uses Brine Air Washers

For some 20 years the California Walnut Growers Association had employed calcium chloride brine air washers for their refrigerated areas. Use of calcium chloride has provided easy means of reducing humidity when it becomes necessary. In the early 1930's the Diamond growers found it necessary to replace their conventional brine spray air washers. At that time their engineers developed an air washer of their own design which eliminates the use of entrance deflectors and brine eliminators.

Generally speaking, it is quite difficult to prevent carry-over of moisture into the fan plenum section, and indeed even in to the duct work, from brine spray air washers. Even with the best of eliminator design and the use of entrance deflectors to straighten the air flow through the brine spray washer, it is generally conceded that quite copious upstream and downstream plenum spaces are necessary to further straighten the air in order to keep the brine spray carry-over to a minimum. While the Diamond design does not completely eliminate carry-over, it has greatly reduced the normal upstream and downstream plenum space requirements and has completely eliminated the use of entrance deflectors and eliminators, and their attendant maintenance problem.

Unique Glass Surface For Air Washer Interior

The "Diamond" design eliminates the brine spray and replaces it with vertical glass plates over which a thin film of brine flows down on each side of the plate and thus exposes a considerable surface to the air. At the new Stockton plant these glass plates are 36-in. high and 42-in. deep in the direction of air flow. It has been found that ribbed glass, with the ribs running vertically, gives the best performance with respect to preventing moisture carry-over.

The glass plates are supported above a shallow brine collecting tray and are positioned at the bottom by means of redwood battens. Redwood is used for support rather than steel to provide a slight cushioning effect for the glass. An eight-inch steel sidewall is provided around the battery of glass plates at the top and isolated from the edges of the glass plates by means of rubber gasketing. This gasketing provides both a brine seal and cushioning for the glass plates.

Between each glass plate a rubber hose is inserted and connected to nipples that extend through the steel side plates. These nipples are then headered on the outside of the steel side plates and air pressure is applied to the hose to expand it against the face of the glass plates. Thus a brine trough is formed at the top of the battery of plates and a level of approximately four inches of brine is carried in this trough. The rate of release of brine down the face of the plates is controlled by the amount of air pressure on the separating hoses.

Clear Refrigerated Storage

The brine air washers and all duct work for the refrigerated areas are supported between the bottom and top chord of the trusses so that there is a free stacking height from floor to bottom chord. Ih the "All-Year" storage room, two 54-in. diam., 25 hp, electric motor-driven vane-axial fans are used each having a capacity of 50,000 cfm. For the seasonal storage, two air washers are provided and four 54-in. diam., 25 hp, vane-axial fans provide 200,000 cfm for this cold area. (See layout and Figs. 4, 5 and 6.)

Waste Becomes Fuel Source

Quite a substantial portion of total production of this plant is in the

Fig. 4 — All year storage room showing palletized operation for both bulk sacked walnuts and packaged walnuts in cartons. Twin railroad spurs extend into the storage. Refrigerated air distribution duct work is in truss over the storage area.

form of shelled walnuts. Disposal of the walnut shells had always been a problem and an expense. In moving to Stockton and starting out with a new plant it became apparent that the walnut shells could be used as fuel to generate steam, a source of power for the refrigeration systems and auxiliaries. For power requirements of 60 hp or more, steam turbine drive was used. This included the main air conditioning fans for the production area, the air conditioning chilled water pump, the brine circulation pumps, the condenser water pump and the cooling tower fan.

Compression Vs Absorption

Since low cost steam was to be used as the source of energy, it became apparent that either a compression system or an absorption system could be used for the refrigeration cycle. Steam in the quantity of 35,000 lbs./hr. was to be generated at 250 psig and 500 F, and steam condensers and the necessary cooling tower capacity provided.

The load on the air conditioning system including both office load and the first phase of plant air conditioning was calculated at 360 tons. Initial thinking on the refrigeration cycle favored the compression system primarily due to the fact that it was more familiar to all parties involved. Consequently it was decided to provide steam driven centrifugal water chilling system for the 360 ton initial air conditioning load. The future air conditioning load for the balance of the production area of the plant would require then, another duplicate unit at some future date.

The total future refrigeration load for cold storage was estimated at 510 tons. It was also determined that 360 tons would be necessary for the initial phase of the new plant. This could be handled by four 10 x 10 VSA ammonia compressors, again steam turbine driven. Brine cooling capacity in the form of horizontal shell and tube brine coolers however was to be provided for the full 510 tons, but ammonia condensers provided only for the initial 360-ton requirement. It would then only be necessary to add compressor and condenser capacity as the refrigeration demand increased in the future.

Specifications for the ammonia absorption system tonnage rating were slightly less severe than for the compression system. The water cooling load (for air conditioning) was held at 360 tons as in the case of the compression system, and the brine cooling load (for refrigerated storage) was also held at 510 tons. However, the total capacity of the absorption system was set at 500 tons. The seasonal pattern of the refrigeration load was almost at a minimum at the time the aid conditioning load peaked. Thus it became apparent that the 500-ton load as set on the absorption system capacity would almost always be sufficient to handle both the air conditioning and the refrigeration requirements. It was felt that if the system did become overloaded, air conditioning could be sacrificed to a certain extent. On this basis comparisons were made.

System Comparisons Made[2]

First cost is of prime importance in any refrigeration system. In large refrigeration systems such as this where a decision must be made whether to use a compression or absorption system, the investment cost is of vital importance. Investment cost, of course, includes all of the costs of ownership in addition to costs of operation and maintenance. As the consulting engineers' and the owners' investigation into the two

[2]While an exhaustive analysis was made by the consulting engineer, only the salient features are mentioned in this discussion.

Fig. 5 — Track level view of the Diamond Walnut Growers temperature and humidity controlled "All-Year" storage. Distribution duct spanning the tracks is visible above the lower chord of the building truss.

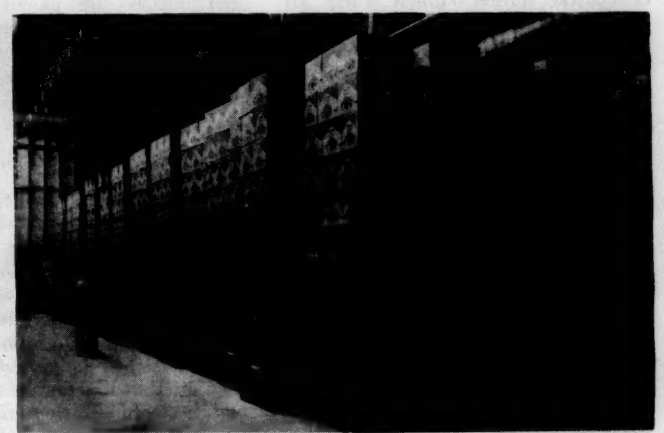


Fig. 6 — Diamond Growers' employee is pictured checking cartons of walnuts stored in the "All-Year" refrigerated building. Product is not only palletized for easy handling, but cartons are arranged on the pallets for proper circulation of refrigerated air between the cartons.

types of system progressed, it became more and more apparent that the absorption system could give great flexibility and at the same time simplify operation for this refrigeration system. Flexibility in itself would have been sufficient to justify the absorption cycle over the compression cycle, even though the first cost may have run five-to-ten percent greater than the compression cycle.

In the design of the compression cycle a split system was necessary to minimize first cost. The air conditioning system was to be handled by a centrifugal water cooling system of 360-ton capacity. (A duplicate future unit would be provided as the plant expanded in air conditioning.) While brine cooler capacity was provided for the full 510 tons, compression and condensing equipment on the ammonia system cycle was provided for only 360 tons. This was considered the minimum safe amount to include in the initial plant.

It was also understood that both the refrigeration and air conditioning demand could exceed 360 tons for short periods of time. It was also acknowledged that while one of the loads may be in excess of 360 tons, the other would rarely be close to its available 360 tons. Since the more economical compression system would be split operation, available capacity of one could not be transferred to the overload demand of the other. This could have been overcome by using a common refrigerant, either Refrigerant-12 or ammonia, by carrying both loads at a common suction pressure such as was finally done with the decision to go to ammonia absorption. This would, however, have resulted in a greatly increased first cost. Therefore the single compression system was ruled out.

Eliminating the steam generating equipment and the cooling tower from an analysis of costs of the two systems, and comparing the cost of the compression system against the absorption system on a delivered and installed basis, the absorption system came out six percent greater in cost than the compression system. This initial comparison, however, did not take into consideration the difference in structural requirements. The comparison did include the cost of the structural steel supporting work for the absorption system, but did not include the building that would be required to house the compression system.

Since the compression system contemplated location of the cooling tower on the roof of the engine room so that vertical shell and tube condensers could be used for the ammonia cycle, the cost of the engine room to house the compression system was a considerable item. In addition, it was originally contemplated that the air washers for the cold storage systems would also be located on the roof of the engine room and would be housed in insulated plenum spaces.

Since the absorption system is basically an outdoor installation, the engine room could be completely eliminated and a small control room substituted if the absorption system were used. This meant putting the cooling tower at ground level and moving the brine spray units into the cold storage areas and locating them above the bottom chord of the truss at no sacrifice of cold storage space. When the difference in cost of building construction was charged to the two systems, the absorption system showed a nine percent lower first cost than the compression system.

Compression Vs Absorption Steam Demands Evaluated

Steam boiler requirements between the two systems was then investigated. With the compression system approximately 21,000 lbs./hr of steam was required for the compressor prime-movers and 14,000 lbs./hr for the auxiliaries, under full load conditions. The absorption system, however, required 14,000 lbs./hr at 14 pounds saturated and this pressure included a two-pound loss for the main steam control valve for the absorption system. Thus it became evident that the steam condensers could be eliminated, and the absorption system used as a steam condenser for the auxiliary turbines.

Steam rate would, of course, increase on the auxiliary steam turbines. The increase of back pressure on the turbines to 14 lbs. resulted in an increase in steam rate for the auxiliary turbines of almost 3,000 lbs/hr. This excess steam could readily be soaked up by the absorption system by operating it inefficiently and/or imposing an artificial load. Therefore, the boiler could have been reduced to 20,000 pounds per hour steaming rate at a considerable amount of savings in cost. Since the project was within the budget it was decided to keep the original rate of 35,000 pounds which appears to be adequate for the future expansion.

With the lower operating cost thus established for the absorption system and with its lower first cost demonstrated, the absorption system was unanimously decided upon. While lower maintenance cost was acknowledged for the absorption plant, this was not a factor in the decision.

Burn Walnut Shell Waste

Part load studies were made in view of the greatly fluctuating seasonal demand for refrigeration. Even down to 10 percent of capacity it appeared that the absorption system would be able to use up all of the excess steam through artificial loading. It was fully acknowledged however, that due to the difficulty in determining exactly what percentage of the auxiliaries would be needed during the seasonal load changes there probably would be periods where a small amount of steam would have to be exhausted to atmosphere. This was considered not to be serious since steam could be produced at very low cost because of the waste walnut shells as boiler fuel.

The boiler is provided with special grates for burning the walnut shells, and is also provided with gas burners in the event of a shortage of shells. A monolithic concrete silo has been provided for the storage of walnut shells and equipment installed for conveying them to the boiler. The cost of fuel is virtually nil since it involves merely the depreciation of the walnut shell storage silo and conveying equipment, plus interest on this investment, minus the cost of shell disposal had the shells not been used for boiler fuel.

Cooling Tower Analysis For Each System

In any comparison of compression against absorption system, a cooling tower must of course be brought into the analysis. In this case, since the compression system was steam driven and therefore required steam condensing equipment, this phase of the two cycles came very close to a stand off in first cost. It should be borne in mind that this absorption system is also used as an excess steam condenser and therefore eliminated the necessity of any auxiliary steam condensing equipment. As far as the cooling tower was concerned heat rejection from the absorbers and condensers of the absorption system is less than the heat rejection from the refrigerant condensers and steam condensers of the compression system. Therefore, even this phase of the cycle favored the absorption system. It was decided, however, to put in an oversized cooling tower to approximate the total anticipated future requirements of 1,000 plus tons.

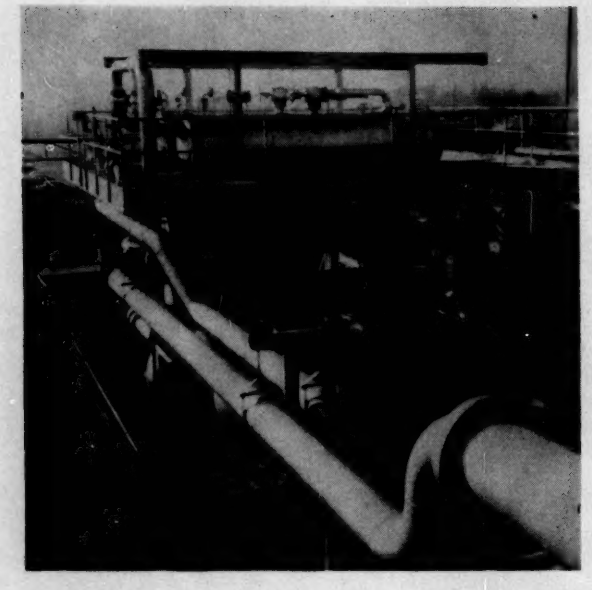


Fig. 7 — View from top of cooling tower at Diamond Walnut Growers plant, Stockton, Calif. Two levels of the machinery platform above the ground are visible, showing the condensers in parallel at the top. Large lines in foreground convey cooling water to and from condenser. Condensers operate in parallel and absorbers are in series.

Future Plant Expansion

The absorption system and its supporting structure was laid out with the realization that the plant would in all probability be expanded to twice its size in the future. Consequently 100 percent standby was requested for the strong aqua pump which is steam turbine driven. The second pump will become the strong aqua pump for the future second section and no standby will then be required.

Maintenance Consideration And Operating Features

Considerable attention was given to the problem of tube cleaning. Since the condensers are in parallel on the water side, either of the two condensers could be taken out of service for cleaning while the other remains in service. The absorbers, however, are in series on the water side and this becomes a more involved problem. Three valve bypasses were provided in the 10-in. water line so that either of the absorbers can be taken out of service for cleaning while the other one remains in operation. Provisions were also made in the supporting structure for easily rigging block and tackle for removal of shell heads.

Perhaps the most interesting feature of this ammonia absorption system is the modification made to allow it to operate as an excess steam condenser. The easiest way to impose an artificial load on the absorption system is to greatly overfeed reflux from the condenser to the bubble column. Excess anhydrous ammonia flows down the column into the generator and must be revaporized, which increases considerably the steam rate to the generator.

Under reduced load conditions the increase in normal steam consumption can be effected by throttling condenser water or by raising condenser water temperature by slowing down the cooling tower fan. During the winter months the tower will be run atmospheric with the fan taken out of service.

Controls Added

A third method of increasing steam requirements is to run at an abnormally low suction pressure. However, additional controls were required. Suction pressure regulators were provided at each of the two brine coolers so that brine temperature could be maintained, but allow absorber pressure to drop as low as necessary to condense the desired amount of excess steam.

Since the brine and water coolers are in parallel with the absorbers, freeze-up control as well as the water temperature control was necessary on the water cooler. At very low absorber pressures of 5 to 10 pounds the temperature is well below 0 F. A pneumatically operated valve was placed in the water cooler suction line and controlled by temperature of chilled water leaving the cooler. Supplementary pressure control was installed to override the refrigerant temperature controller, and set at a pressure such that the refrigerant temperature would never fall below 30 F.

Absorption System Handles Overload

Another advantage of the absorption system that was not overlooked was its ability to handle a considerable overload above design rating merely by increasing the back pressure on the turbines even though it would probably mean venting some excess steam to the atmosphere. A compression system would not have such an overload feature.

This rather unique power plant and refrigeration system would not have come into existence had the consulting engineer firm not recognized the opportunity and the challenge to capitalize on waste for low cost fuel for power. It all goes back to the Diamond Walnut Growers' original problem — how to dispose of walnut shells!

Chief Engineer J. Frank Orr (left) poses with plant engineer R. F. Strobel before the control panel and instrument board for the boiler and absorption plant. Orr has been with Diamond Walnut Growers since 1928.

New Atomic Powered Submarines Equipped with Heavy Duty Cooling Systems

TACTICAL Employment of atomic-powered submarines requires not only heavy duty cooling equipment for air conditioning, but special provisions are also incorporated in the design of these vessels for continually revitalizing the atmosphere inside the ship. The USS Nautilus and USS Seawolf have refrigeration plants of 240 tons each. Four additional Skate-class vessels now under construction, being smaller, will have compressor capacity of 160 tons each. All six have special absorber-filters of activated coconut-shell charcoal as an integral part of their air conditioning systems.

The vital importance of the air cooling and purification system for atomic submarines has been dramatically illustrated by the Nautilus. The Navy disclosed that during its trial runs the Nautilus cruised entirely submerged from New London, Conn., to San Juan, Puerto Rico, a distance of about 1300 miles, setting a new travel record. Submarines using batteries can go only about 100 miles underwater, the Navy reports.

The atomic submarine Seawolf slides into the water of the Thames River as she is launched at Groton, Conn. Ship was christened July 21 by Mrs. W. W. Sterling Cole at the shipyard of the Electric Boat Division of General Dynamics Corporation. — Official USN Photo

Reactor Heat Load Involved

Although the atomic power plant made the unprecedented feat possible, air conditioning was essential to remove reactor heat, and odors from machinery and cooking, and to provide habitable temperature, humidity and air quality for the crew. A tremendous amount of heat is given off by the steam produced by the reactor to drive the sub. The interior atmosphere must be constantly cooled to maintain satisfactory conditions for efficient operation of the underwater vessel.

Excess moisture must also be removed continually from the air and "used" or stale air freshened. Although engineering details have not been revealed, fumes and odors from machinery, not usually considered a problem on the surface when outside air can be drawn in, is removed by special air conditioning apparatus. Cooking odors are similarly dissipated.

The Nautilus, in for shakedown repairs, and the Seawolf, being fitted out for its sea trials, are alongside dock of their builder, the Electric Boat Division of General Dynamic Corporation. Provision of clean air at comfortable temperature and humidity permits these new atom vessels to cruise submerged for weeks at a time. — Official USN Photo

Air Purified With Charcoal

Among these special provisions are odor absorbers of activated, coconut-shell charcoal, supplied for both the Nautilus and the USS Seawolf, by the Barnebey-Cheney Company of Columbus, Ohio, through its Pur-Air Division. The main purpose of these absorber-filters is to remove odors, purify and freshen the air within the undersea craft. The reactor provides enough surplus energy to run this system also.

All of the ship's air is passed through the charcoal filters by this air conditioning system, and the charcoal removes undesirable odors and gases. With the exception of complete air conditioning, the Nautilus' use of charcoal filters is similar to conventional submarines now being built for U. S. Navy and several South American countries.

More special charcoal filters were built by Barnebey-Cheney for vent pipes of the waste tanks from the galley and head. These tanks, in which waste from the kitchen and lavatories is dumped, must be vented within the sub itself. The special charcoal filters remove odors and

gases from these tank vents. All water closets on the sub are equipped with small charcoal fresheners to remove another source of odors aboard.

High Velocity Air System

The entire air conditioning operation is all accomplished under water, without the use of such previously employed devices as the "snorkel" breathing apparatus to bring in air from the surface and while avoiding the release of any tell-tale bubbles. In addition to maintaining comfortable temperature and humidity levels for travel from arctic to tropic waters, it was necessary that the cooling equipment require a minimum of space and weight. To help cut down on space requirements conditioned air is sent to all parts of the vessel at great speeds and high pressure through small duct lines.

Carrier Corp. compressors, condensers and coolers, heart of the cooling systems, operate in casings built to withstand the transmission of shock which might result in combat activity. Total capacity of the compressors in each of the four Skate-class ships is equal to the melting of 160 tons of ice over a 24-hour period. The first two atomic subs, both of them larger, had cooling plants totaling 240 tons each.

One of the important conditioning problems, according to Leo E. Starr, manager, Carrier's Marine Dept., is removal of moisture evaporating from personnel, cooking and washing machines. With these vessels cruising underwater most of the time, such water vapor would have no means of escape and would build humidity up to almost intolerable levels without air conditioning. High humidities also make odors more noticeable.

Central System

The elaborate central system is intended to provide air as fresh, clean and pleasant — even after weeks under the surface — as that in the Pentagon in Washington or aboard any of the four new Forrestal-class aircraft carriers, all of which are reported as having Carrier air conditioning equipment. Two years after shakedown, tests and subsequent operations indicate satisfactory performance of the submersible systems.

Like the Nautilus and Seawolf, the USS Skate is the third nuclear undersea fighting ship to be built by Electric Boat Division of General Dynamics Corporation at Groton, Conn. Two of the Skate's sister ships will be built at the Portsmouth Naval Shipyard, and one at the Mare Island Naval Shipyard.

San Francisco ASRE Section Honors Glen Sorber For Scientific Contributions

RECOGNIZING his many scientific contributions to the refrigerating and freezing of western foods, the San Francisco Section, ASRE, recently presented Glen Sorber, retired, with an engrossed copy of a resolution passed by the Section in his honor. Sorber made the contributions as a research worker in the U.S. Department of Agriculture, in earlier years at Los Angeles and later in Albany, California. In his later years of service, ending in October, 1955, Sorber worked with most of the frozen food plants in the western states, supplying technical information and developing research projects.

Presentation of a resolution to Glen Sorber testifying to his achievements in refrigeration and food technology by the San Francisco Section, ASRE. Standing at left, H. C. Diehl, Director, Refrigeration Research Foundation, and formerly associated with Sorber in the Albany laboratory. Standing at right is Dr. M. J. Copley, Chief of the Western Utilization Research Branch of the Department of Agriculture in Albany. Sorber is seated at left, and Wally Hulse is making the presentation.

The scroll was presented by Wally Hulse, representing the San Francisco Section of the Society. Hulse, charter member of the San Francisco Section and manager of the Refrigeration Machinery Corporation (Vilter Distributors) was elected to make the presentation because of his identification as a pioneer in frozen food processing and equipment development, as well as his close association with Sorber's research work. Wording of the resolution is as follows:

"Whereas, the members of San Francisco Section of The American Society of Refrigerating Engineers record with regret the retirement of Glen Sorber, a fellow engineer, whose service to the refrigerating industry and to food technology extended over a period of thirty-five years, and was marked by sound judgment and inspired loyalty to the industry—and to his fellow engineers. His friendly advice and great ability ever guided us with respect to the best interests of our industry as a whole and to The Society in particular.

"Resolved, that The American Society of Refrigerating Engineers record the honor of having the privilege of their close association with the aforementioned Glen Sorber by saluting him singly and collectively, and wishing him a well-deserved retirement after years of achievement that has come to very few in our industry.

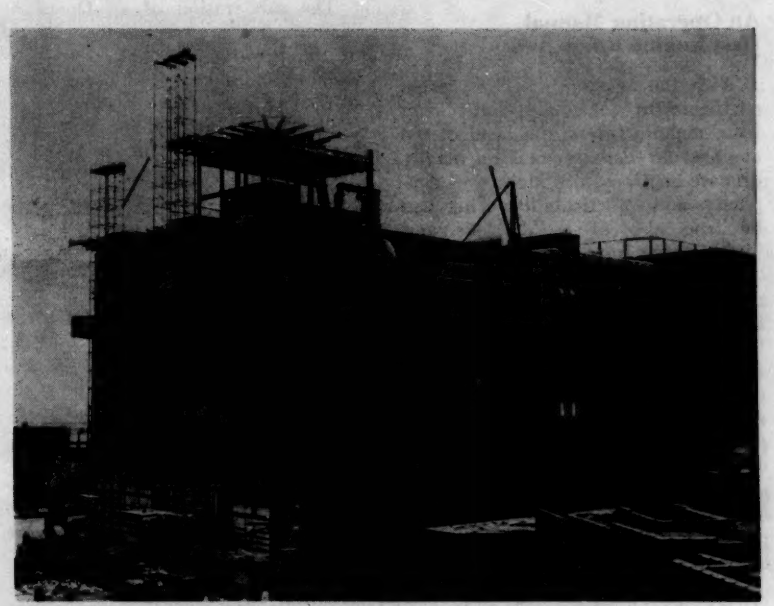
"Resolved, that The American Society of Refrigerating Engineers also desires to record that it reserves the right to be advised by him at any time in the future.

"Resolved further, that a scroll containing these minutes be engrossed and a suitable copy be presented to Glen Sorber. Witness our hand and seal on this 20th day of December, 1956."

Practical Refrigerating Engineer

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS

One Role of Engineering Supervision in the — Prevention of



Initial start-up procedure and operating instructions are as important as the care given in manufacture and erection of refrigeration equipment.

REFRIGERATION PLANT FAILURES

LONG machinery life often stems right from practices followed in the initial erection, testing and first operating procedures. Good design, accurate manufacturing, competent erection, and subsequent proper operation, are to no avail if proper operating instructions are ignored or unknown when equipment is first started up. Responsibility for supervision of erection, testing and "lighting-off" is that of the Chief Engineer.

However, the Chief Engineer cannot be in a number of places at one time. Start-up of new equipment requires the supervision of competent

The Educational Committee
NAPRE

engineer personnel at major units in any system. And, in new construction or major alteration work, several systems may be required simultaneously, further complicating the matter of attendant operation.

In this day of complicated control apparatus, technically trained assistant engineers are scarce. More than often, they are not available at all. How can this chief spread himself so thin as start-up supervision may demand? Even though he could produce a twin, equally trained and competent, it's doubtful that between them, they could turn in a satisfactory performance.

As previously indicated, today the Chief may be the only experienced or technically trained engineer in the plant, his personnel being new or unfamiliar with the equipment. How is he to establish and maintain the best operating procedures?

In-Plant Training Program

The answer is to conduct a plant training program for engineer personnel. It's a long established role for the Chief. He is the practical teacher — the instructor for his firm and his plant.

To hold classes in the majority of plants, would not only be impractical, but an uneconomical burden as well. (Not true in all cases, however, as proven by many established, training routines with more progressive firms). However, there are a few usable "paper-work" tools which the Chief can originate, and considerable literature available to him for instruction purposes. Tools are the Operating Manual, and Service and Maintenance Instructions, Machinery History, etc., worked up by the supervising engineer. Literature of course, includes the manufacturer's data and instructions on individual items of equipment in the plant.

Manufacturers' literature is usually furnished in duplicate. This does not pre-suppose or imply that other sets are not available. The plant engineer should obtain additional sets and provide his responsible engineer personnel with such data. If time permits, general discussions on each

EXECUTIVE OFFICE NAPRE
433 N. Waller Ave.,
Chicago 44, Ill.
OFFICERS
President: Bert C. McKenna
Chicago 12, Ill.
Secretary, J. R. Kelahan, Chicago 44.

Operating engineers of all refrigerating plants are invited to affiliate with the National Association of Practical Refrigerating Engineers, Inc., an educational association, "not-for-profit".

major machinery unit should be held. Pertinent data in the instructions should be noted. (And those original two sets filed, also; one in the main office, the other in the Chief's library or files).

An Operating Manual Best Engine Room Text

With the assistance of the design engineer or consultant, plus data from manufacturers, the head of the engineering department can readily prepare an Operating Manual of simplicity and practicability. This can be true also of the Service and Maintenance Instructions.

Since NAPRE's National President, Bert C. McKenna, provided information on the latter in his paper "Maintenance Practices and Procedures in the Prevention of Refrigeration Plant Failures", INDUSTRIAL REFRIGERATION, August 1956, this paper will briefly outline basic contents of an Operating Manual. Some data given here is from the Operating Manual for one of several brewery plants, in a large U. S. multiple-plant brewing enterprise.

The Operating Manual in subject plant is actually in two parts. Part I contains general descriptions of the various plant systems and their components. For example, the Operating Manual for the subject brewery plant has a description of the brewing capacity, brewing cycle and future expansion provisions.

Following the general description, the Manual contains additional data on boiler and refrigerating capacity, CO_2 collection and liquefying system, and utilities which are of direct use in the brewing process itself. This Part I of the Manual also covers the bottling department, grain storage and other matters not of direct concern to the engineering department, but nevertheless of an informative nature.

Part II of the Operating Manual contains the actual operating instructions. For example under the refrigerating system, Part II has chapters describing how to place the refrigerating machinery in operation, how to change-over, stop, and vary operating functions.

The plant today which does not have an Operating Manual is in the position of the teacher who is trying to teach a course without a text book from which the student can prepare his lessons. The Chief Engineer and/or his supervisor can prove their ability and become a more important part of management by producing such a manual. Naturally the work cannot be done overnight. Like a machinery history, it must be made up over a considerable period of time and in a chapter-by-chapter work order.

Preparing An Operator's Text

The preparation of an Operating Manual, if it is to follow the example of the brewing manual referred to, should contain the following items in Part I:

A. Introductory Remarks — a brief statement of what is generally expected of the entire plant. (It should answer the question as to why the plant exists and what it was designed to do.)

B. Various Systems — utilities contributing to the process or performance of the overall enterprise are described.

C. Processes — described in general and to the extent of how the engineering contributions help the end results.

D. Principal Components — major units of equipment in each system are mentioned; description should be "in a nutshell", or very general.

Detailed Instructions

Part II of the proposed Operating Manual should contain detailed operating instructions. Again, the material in this part of the Manual can be segregated into four parts:

A. A general statement or introductory remarks on the cooperative part which the engineering department plays in the purposes of the business..

B. Detailed operating characteristics on starting up and securing systems or utilities essential to the business processes should be described. Variations for seasons or changeable process procedures should be included in this section.

C. Processes which do not require utility service but nevertheless have complicated engineering machinery as an intricate part should be described in detail in this portion. For example, the process fluid itself may require thermostatic or electronic regulation. Other employees operating process equipment may know nothing of these controls and the engineering department is often expected to service and maintain such apparatus.

D. This section should contain a detailed description of all machinery and instruction on how to start it up, stop the machinery or secure it and variations in operating such units of equipment. With each principal item should be included detailed data on its prime mover and controls.

Specimen Sections Quoted

Following are a few chapters from the Operating Manual of another brewery. These chapters were prepared by the supervising engineer of this firm. In general, they apply to all plants under the supervising engineer's jurisdiction. The Chief Engineer in each plant supplies the details for his own particular establishment. In addition, the chief is also responsible for the posting of detailed operating instructions in the vicinity of the control station for each system, or major operating unit. In these cases the chapters from the manual, when reproduced, serve very well as instruction cards placed strategically around the plant.

These immediate examples, identified by sub-heads, were taken from Part I, subdivision (A), of the subject Operating Manual:

Wort System

"Hot wort is pumped from the hop strainer tank on ground floor of Brewhouse up to a hot wort balance tank on 3rd floor of Cellar Building. This hot wort tank has a capacity of 200 bbls. and is uninsulated. Hot wort is pumped by a bronze centrifugal pump from hot wort tank to the centrifuges or hot wort clarifiers at a rate of 140 bbl. per hour, thus requiring about 1-2/3 hours for cooling.

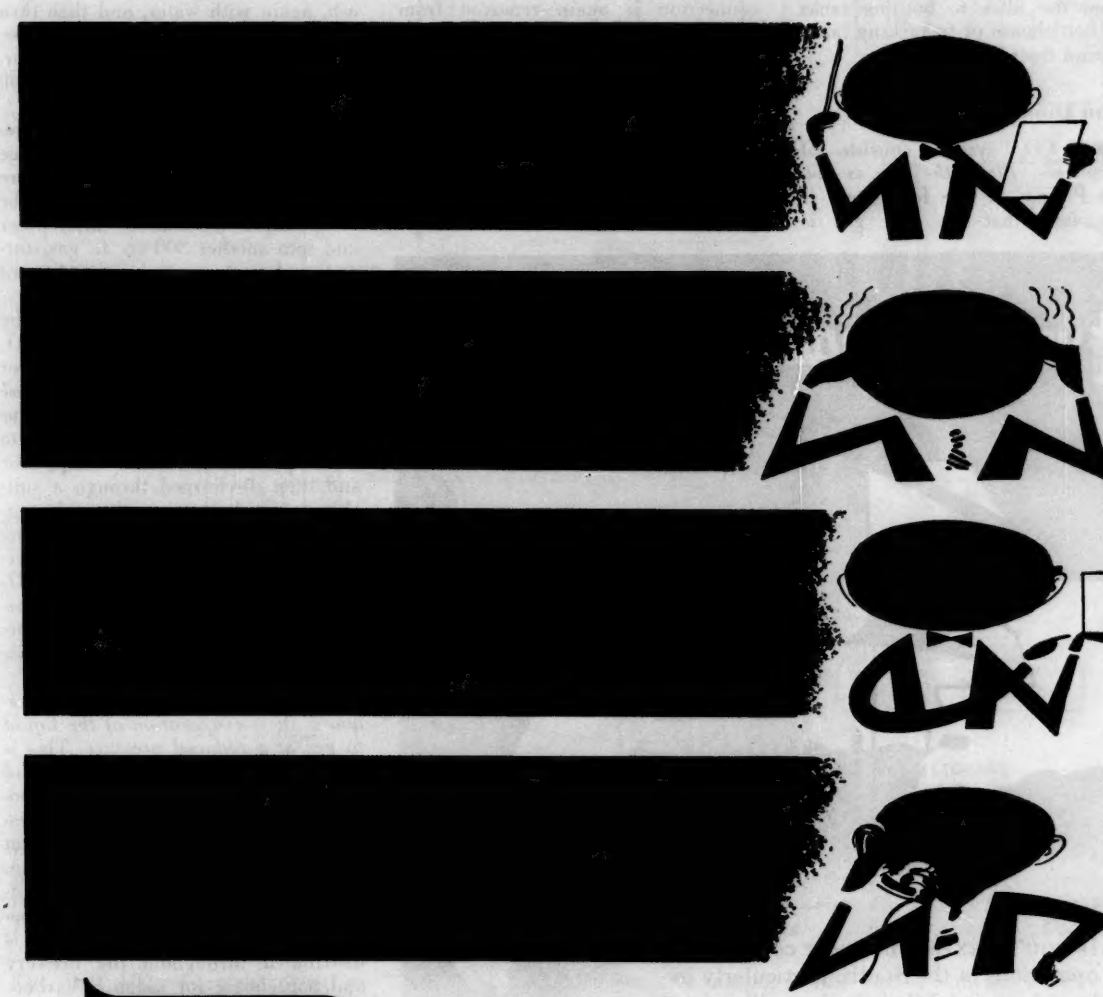
"Wort will enter the cooler at 200° to 190° F and will leave at about 45° F. Operation of the wort cooler is entirely under automatic control insuring a constant temperature for both wort and water leaving the cooler. It is very important that the water temperature leaving the cooler be maintained constant because this water is used later for brewing processes. Heat recovered from the wort cooler will result in a saving of steam which otherwise is required to heat cold water to the desired temperature."

Cold Wort and Beer

"Wort after leaving the cooler at a temperature of 45° F drops by gravity to the closed fermenters on floors below. All of the fermenting tanks are closed and equipped for collection of CO_2 gas.

"After fermentation the beer is passed through a beer cooler to the ruh tanks located on floors below the fermenters, where it remains until required for finishing stage. When ruh beer is withdrawn from the ruh cellar it is passed to the filter room where it is passed through filters, carbonators and coolers before storage

Have You a Special Heat Transfer or Chiller Problem?



Vogt

Has the answer in its Scraped Surface Exchangers

Send for Bulletin PE-1 today.
Address Dept. 24A-RIIR

OTHER VOGT PRODUCTS: Drop Forged Steel Valves, Fittings and Flanges in a complete range of sizes • Petroleum Refinery and Chemical Plant Equipment • Steam Generators • Heat Exchangers • Ice Making and Refrigerating Equipment.

HENRY VOGT MACHINE CO., P. O. BOX 1918, LOUISVILLE 1, KY.

SALES OFFICES: New York, Chicago, Cleveland, Dallas, Philadelphia, St. Louis, Charleston, W. Va., Cincinnati, San Francisco

in finishing tanks. Later the beer is withdrawn from ground floor finishing tanks and flows back to the filter room where it is pumped through a carbonator, cooler and another filter press. Finished beer is passed directly from the filter to bottling tanks at the bottlehouse or to racking tanks on ground floor."

Carbon Dioxide System

"Plant CO_2 system consists of three phases. *First, the gas is collected.* Piping on the fermenters is so arranged that the first gas is blown off to the atmosphere. When gas has reached an approved percentage of purity the connection from the tanks is changed to CO_2 compressor suction line. After CO_2 is collected for a desired period, the connection is again removed from compressor suction line and placed on the atmospheric blow-off. Any quantity of CO_2 gas at any desired pressure and stage of fermentation may be collected for re-use.

"*The second phase of this CO_2 system is the so-called compression and liquefaction stage* (see Fig. 1). CO_2 passes from the fermenters through a foam trap where any liquid carryover is separated from the gas. From the foam trap, CO_2 passes to the first stage compressor, through a compartment purifier where it is washed in turn by water, permanganate of potash, again with water, and then thru a single carbon filter. Then CO_2 passes through the first stage compressor, a suitable aftercooler and into a 300 cu. ft. gas storage tank at 100 psi.

"The second stage compressor receives gas at 100 psi from first stage storage tanks and raises the pressure to 240 psi by passing through the compressor, a suitable aftercooler and into another 300 cu. ft. gas storage tank, where it is stored until more liquid CO_2 is required.

"Liquefaction of CO_2 is obtained by the portion of the system where CO_2 gas at 240 psi is passed thru a dryer to a condenser and liquefied by use of liquid ammonia. Ammonia gas from the CO_2 condenser is passed to a low pressure ammonia compressor and then discharged through a suitable desuperheater into the main ammonia suction line where it again becomes a part of the general refrigeration system. The liquefied CO_2 drops by gravity from CO_2 condenser into a 390 cu. ft. CO_2 liquid storage tank with a capacity of approximately 25,000 lbs.

"*The third phase of this CO_2 system is in re-evaporation of the liquid to gas at a reduced pressure.* This is accomplished by passing the liquid through a specially designed evaporator which makes use of low pressure steam to produce sufficient heat for continuous evaporator operation. The re-evaporated CO_2 gas passes into two usage tanks from the evaporators at 100 psi from which it is distributed throughout the brewery and bottlehouse for usage in carbonating beer; as counterpressure on finishing, bottling, and racking tanks, and for work and control media on bottle filling machinery.

Refrigeration System

"Refrigeration throughout the plant is provided by CaCl brine which is cooled by ammonia and circulated throughout the building. There is no ammonia in the brewery except in the engine room area. This brine refrigerating system is efficient, easy to control, safe and lends itself to automatic operation with simple instruments. Three ammonia compressors are used and all three will be automatically controlled by changes in the refrigeration load.

"These three compressors are of ample refrigerating capacity for the brewery of 125,000 bbl. capacity.

IF YOU'RE EXPANDING your cold storage operations in the South, particularly in Louisiana and Mississippi, you'll want to consult with deep South experts on insulating materials and installation. REILLY-BENTON Company, Inc., operating in this area for nearly two decades, stands ready to help with your new cold storage facility. Contact us now, in the planning stages of your project, and one of our qualified, experienced representatives will work with you on the insulation phases of your projected operation.

Reilly Benton company, inc.
INSULATIONS
Insulation Engineers and Contractors
2502 POYDRAS ST., NEW ORLEANS, LA.

Jenni Genetron says "HERE'S THE

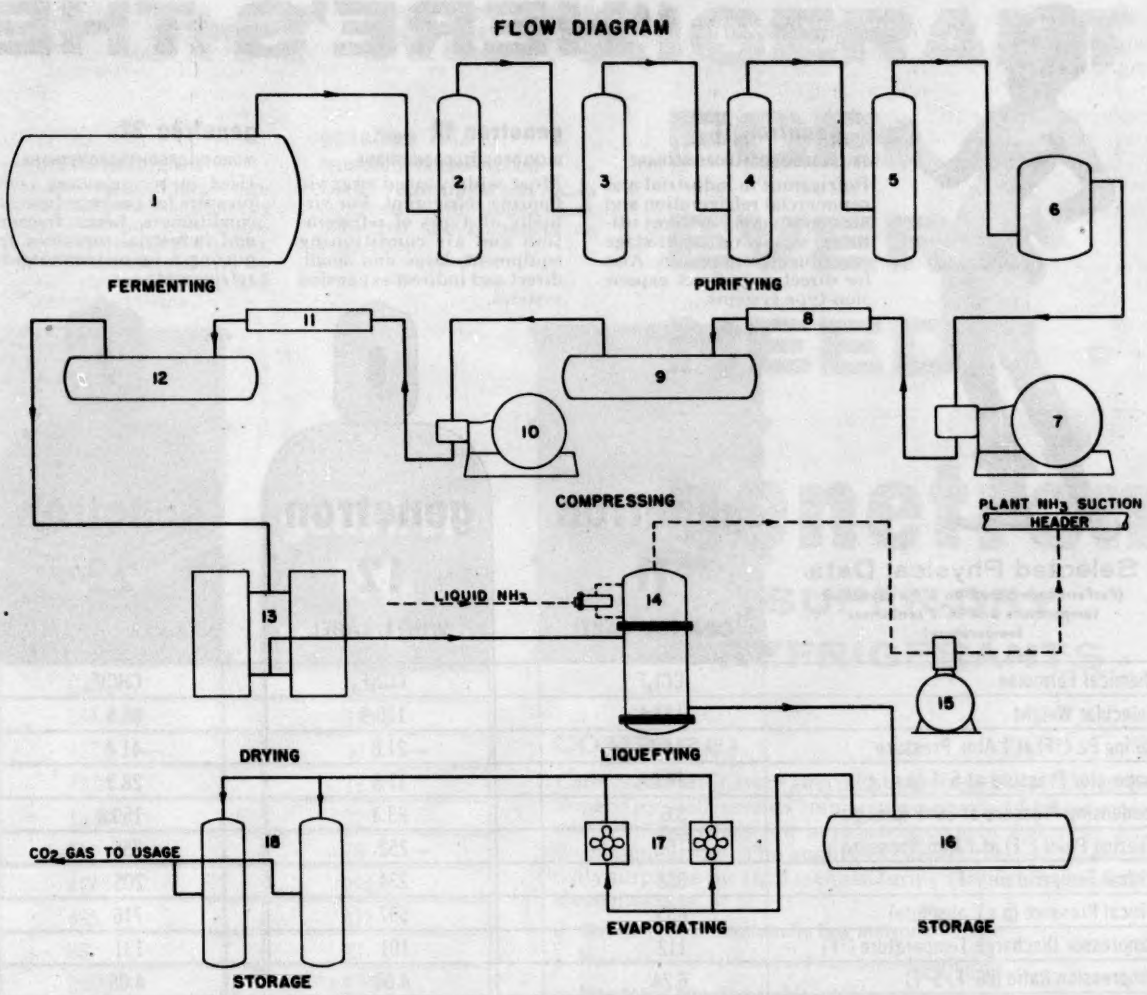


Fig. 1 — Flow diagram for CO_2 liquefication process: 1. Fermenters; 2. Foam trap; 3. Water scrubber; 4. Potassium permanganate scrubber; 5. Water scrubber; 6. Carbon filter; 7. First stage compressor; 8. First stage aftercooler; 9. First stage storage tank; 10. Second stage compressor; 11. Second stage aftercooler; 12. Second stage storage tank; 13. Dryer; 14. Condenser; 15. Ammonia booster; 16. Liquid CO_2 storage; 17. Evaporator; 18. Usage tanks.

The two 100-ton refrigerating capacity brine coolers have ample capacity for the brewery production of 160,000 bbls. Brine is circulated through the system and coolers by two centrifugal pumps, one of 400 gpm and one of 800 gpm The smaller may be in service when refrigeration demands are light, such as in cold weather and on week ends, and the larger pump may be put in service when the load is too great for the smaller unit.

"So-called unit coolers are used throughout the cellars for maintaining proper temperatures. Several of these units of smaller capacity are used rather than one or two larger units in each cellar because they easily distribute the refrigeration about the building without the necessity of using ducts for this purpose. Defrosting of the cooling units is simplified without the hazard of increasing cellar temperatures during the defrosting period. There are a sufficient number of units installed so that one may be out of service for defrosting at any time without affecting the cellar temperature. Another advantage of the small units is that they are suspended between tanks so that no floor space is required.

"Brine control for attemperator coils is very simple and positive, by manually operating calibrated valves on the supply to the coil. Large volumes of brine will be circulated through the attemporator coils at a relatively high temperature. This arrangement will provide ample refrigeration in the fermenter but will minimize freezing beer on the coil. Brine control on wort cooler is completely automatic and is controlled by temperature of wort leaving the cooler. Brine supply temperature is maintained at 19° F, and return temperature varies with the load."

Sample Operating Chapter

The above chapters were selected at random from between such other Part I chapters as Grain Handling, Brewing, Yeast System, Steam System, Air Conditioning, etc. Complete chapters, of course, are not printed here, as space would not permit. Readers can readily imagine the amount of space that would be required for reproducing the contents of Part II. Therefore, the authors have chosen only a portion of the chapter on refrigeration.

Refrigeration Start-up

"To put in operation — Procedure:

"1. Inspect and test brine coolers, both brine and ammonia sides, to a

(Continued on page 37)

RIGHT REFRIGERANT

Jenni Genetron says, **"HERE'S THE**

genetron 11

TRICHLOROMONOFLUOROMETHANE

Refrigerant in industrial and commercial refrigeration and air conditioning systems utilizing single or multi-stage centrifugal compressors. Also for direct or indirect expansion-type systems.

genetron 12

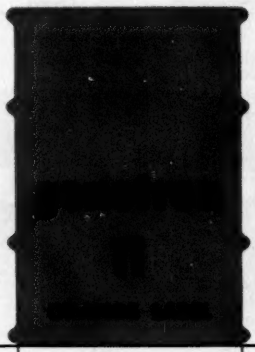
DICHLORODIFLUOROMETHANE

Most widely used organic fluorine refrigerant. For virtually all types of refrigeration and air conditioning equipment, large and small, direct and indirect expansion systems.

genetron 22

MONOCHLORODIFLUOROMETHANE

Used in reciprocating compressors for package type air conditioners, home freezers and industrial processes requiring a lower-temperature refrigerant.



Selected Physical Data

(Performance based on 5°F evaporator temperature and 86°F condenser temperature)

Chemical Formulae	CCl_3F	CCl_2F_2	$CHClF_2$
Molecular Weight	137.4	120.9	86.5
Boiling Pt. (°F) at 1 Atm. Pressure	74.7	—21.6	—41.4
Evaporator Pressure at 5°F (p.s.i.g.)	24.0*	11.8	28.3
Condensing Pressure at 86°F (p.s.i.g.)	3.6	93.3	159.8
Freezing Point (°F) at 1 Atm. Pressure	—168	—252	—256
Critical Temperature (°F)	388	234	205
Critical Pressure (p.s.i. absolute)	635	597	716
Compressor Discharge Temperature (°F)	112	101	131
Compression Ratio (86°F/5°F)	6.24	4.08	4.06
Specific Volume of Saturated Vapor at 5°F (cu. ft./lb.)	12.27	1.46	1.25
Latent Heat of Vaporization at 5°F (B.t.u./lb.)	84.0	68.2	93.6
Net Refrig. Effect of Liquid—86°F/5°F (B.t.u./lb.)	67.5	50.0	69.3
Specific Heat of Liquid at 86°F (B.t.u./lb.°F)	0.21	0.24	0.34
Specific Heat of Vapor at Constant Pressure of 1 Atm. & 86°F (B.t.u./lb.°F)	0.13	0.15	0.15
Specific Heat Ratio at 86°F & 1 Atm. ($k = Cp/Cv$)	1.14	1.14	1.18
Coefficient of Performance	5.09	4.70	4.66
Horsepower/Ton Refrigeration	0.927	1.002	1.011
Refrigerant Circulated/Ton Refrig. (lbs./min.)	2.96	4.00	2.89
Liquid Circulated/Ton Refrig. (cu. in./min.)	56.0	85.6	68.0
Compressor Displacement/Ton Refrig. (c.f.m.)	36.32	5.83	3.60
Toxicity (Underwriters' Laboratories Group No.)	5A	6	5A
Flammability & Explosivity	None	None	None

*Inches of mercury vacuum.

RIGHT REFRIGERANT FOR EVERY NEED!"

genetron 113
TRICHLOROTRIFLUOROETHANE
Used in 50-ton and larger centrifugal compressors, primarily for large comfort cooling systems, brine cooling systems, and other commercial and industrial air conditioning and refrigeration systems.

genetron 114A
DICHLOROTETRAFLUOROETHANE
Used in centrifugal and rotary compressors for commercial, industrial and household refrigeration.

$C_2Cl_3F_3$	$C_2Cl_2F_4$
187.4	170.9
117.6	37.6
27.9*	15.6*
13.9*	22.7
—31	—76
417	294
495	478
86	88
8.02	5.33
27.04	4.04
70.6	60.2
53.7	43.0
0.22	0.23
0.15	0.16
1.09	1.01
4.92	4.60
0.960	1.025
3.73	4.65
66.5	88.7
100.76	18.78
4-5	6
None	None

genetron®
SUPER-DRY REFRIGERANTS

COMPARE!

Careful control at every step in the manufacture of "Genetron" Super-Dry Refrigerants results in products of highest purity, which are extremely low in moisture content and other undesirable impurities. The quality of current production consistently surpasses the rigid manufacturing specifications listed for these products.

- **Guaranteed exceptionally low moisture content**
- **Non-corrosive to standard equipment materials**
- **Non-toxic, non-flammable, stable, safe**
- **Critical and freezing points well outside range of operating uses**
- **Solvent action on oil helps prevent solidification or congealing of lubricant**
- **Aid in lubrication of equipment; generally miscible with oil**
- **Freely interchangeable and may be mixed in any proportions with comparable fluorinated hydrocarbon refrigerants meeting the same strict refrigerant specifications**
- **Approved and certified as original or replacement charge by leading refrigeration equipment manufacturers**
- **Available everywhere . . . see your refrigeration wholesaler**

Allied Chemical

For further information
SEE YOUR
REFRIGERATION WHOLESALER
or call or write

genetron DEPARTMENT
GENERAL CHEMICAL DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

From the President's Desk

Venemann Fund Drive Opens – Detroit Chapter Tops Contributions

CHRISTMAS came very early in the 1957 term for NAPRE's Professor H. G. Venemann Memorial Education Loan Fund. Michigan Chapter No. 1, Detroit, played the role of Santa Claus, through the person of Charles M. Heemstra, then president of the Detroit Chapter, and new Chairman of the loan fund.

Setting was the friendly atmosphere of the Detroit Chapter annual Christmas party. Two U.S. Savings Bonds were presented to the National President of the Association, who was on hand, not only to receive the contribution, but also to enjoy the hospitality of the Michigan members and their families. The National President was accompanied by Earl J. McMichael, representing Chicago Chapter, who made the trip as a member of Chicago's Publicity Committee for the express purpose of extending an invitation to Detroit members to attend the 1957 Convention to be held in Chicago in November.

Although it is the policy of the Association and Fund Committee not to discuss amounts of any single contributions, it can be reported here that the two bonds surpassed not only the highest single contribution to date, but was also greater than the sum of several donations from any single chapter or individual. The Venemann Committee, along with the officers and members of NAPRE join in thanking Michigan Chapter for their wonderful spirit in giving to this worthy memorial.

Reinstatement Without Penalty

At the recent convention in Detroit, NAPRE's Board of Directors recommended to the delegates and received action on said request in the form of an amendment to the By-Laws which permits delinquent members to reinstate their membership within a two-year period. Article 15, Section 4 of the By-Laws now provides that any member who has been in arrears with his dues up to two years may reinstate by paying the current year's dues.

This feature will enable the Chapters to reinstate between four and five hundred members who have gotten behind to the extent that it is a financial hardship to pay up to three year's dues or to pay reinstatement fee. It was believed that provisions of the By-Laws prior to amendment, handicapped the Chapter Conservation committees in their work.

Vice-president Frank Chase reports through the national office that every other chapter remittance received since the first of the year contains the name of at least one member who has reinstated. Vice-president Roy T. Burns has also indicated that a very pleasing number of members-at-large have taken advantage of the same opportunity. These early reports indicate the wisdom of this action taken by the Association delegates at the 47th Convention. The only drawback is that none of these members who reinstate will be able to obtain any of the past publications. The supply in the national office is too limited to attempt any replacement, and even if replacements were attempted each member would probably end up paying prices for the individual material which would total an amount almost equal to a reinstatement fee or the back dues.

Seattle Scribe Takes Chapter Report Award

As announced in the pages of this column last month, the 1957 budget of the Association provides for the award of a U.S. Savings Bond to the chapter scribe who turns in the best report of the year. For January the monthly citation went to Fred Herr of Los Angeles. In the opinion of the Reports' Committee, which consists of the national president, the national secretary and the editor of our official organ, the report citation for this month goes to member E. John Grainger, secretary of Washington Chapter No. 1. Grainger has come up consistently with very excellent reports and it is very evident that he puts in considerable time and effort on his notes.

The committee is having his report reproduced and will mail several copies to chapter officers. It is hoped that this circulation will serve as a sample or specimen for chapter scribes to study and use as a guide in preparing their own reports. The Reports' Committee sincerely believes that the quality and educational contents of the chapter reports can be improved upon, although all of the reports submitted are done so with sincerity and promptness. Hope of the committee is to encourage the continued cooperation of the chapters and their reporters in obtaining publicity for their chapters and extending the information and knowledge gained through their meetings to the entire membership.

Venemann Memorial Fund Chairman Charles M. Heemstra, (right), presents two U.S. Savings Bonds to National President Bert C. McKenna on the occasion of Michigan Chapter No. 1 Christmas party. The bonds were reported to be the largest single contribution yet received.

Adds to Instructor's Manual

Late in January all chapters should have received the latest copies of the Instructor's Manual for use in connection with *Basic Refrigeration* by Guy R. King. NAPRE's vice chairman of the Educational Committee (King) prepared Chapters 16 and 18 for circulation. Professor King explains that he is skipping certain chapters in order to give the more essential sections of the refrigeration course priority. In other words, the chapters provided first will help local instructors put over the most basic fundamentals of refrigeration and air conditioning. The chapters which will follow at a later date are considered important, but less essential in teaching our newer members the rudiments of the game.

Following are the chapters published thus far by King: Chapter 1 to 8 in order: Fundamentals; Chapter 14, 15: Operating and Servicing; and Chapter 16, 18: Insulation and Heat Calculations.

These Chapters will follow during the course of the year: Chapter 20, 21: Compressor Calculations; Chapter 19, 11, 13: Humidity, Defrosting and Food Preservation; Chapter 10, 12: Compressor Drives, Lubrication; Chapter 9, 17: Controls, Valves, Instruments, Meters; and Chapter 22 through 29, in order: Pressure Drops, Brine, Liquids, Complete Systems, CO_2, Altitude, Absorption Systems, and Codes.

Bert C McKenna

Magnesium Chloride Suitable

settle in the lines and coils. This topic has

Defrost Electrically

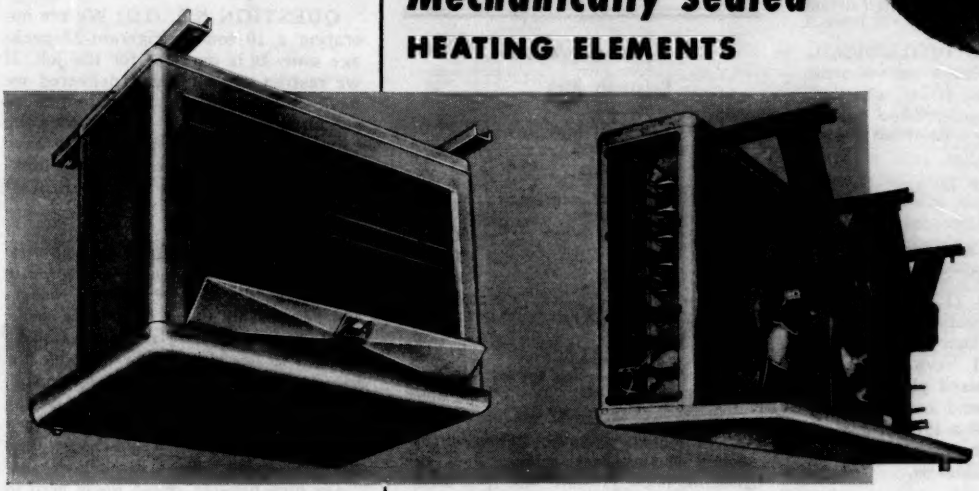
SAFELY...SURELY

with DUNHAM-BUSH 'ED' UNITS

NOW FEATURING

Mechanically sealed

HEATING ELEMENTS



DRAIN PAN HEATING PAD

Conductive rubber electrical heating blanket provides quick, safe heat that prevents refreezing of water during defrosting. No heating wires . . . heating element is conductive rubber, hermetically sealed, shockproof and waterproof.

No defrost problems with these Dunham-Bush low temperature units! *Mechanically sealed* heating elements provide *positive* protection against entry of water into system. Defrosting is safe . . . sure . . . complete. And control kit (furnished) makes defrosting *entirely automatic.*

Inner-Fin® coil construction, exclusive with Dunham-Bush, permits units to defrost *from the inside.* Heat source for defrosting is a specially designed heater cable contained within the inner tube. Greater surface area which Inner-Fin construction provides assures rapid distribution of heat, quicker defrosting and minimum room temperature rise.

Units are available in capacities from 4500 to 36000 BTU/hr.

Write for complete information.

Dunham-Bush, Inc.

DUNHAM-BUSH

WEST HARTFORD 10 • CONNECTICUT • U. S. A.

AIR CONDITIONING, REFRIGERATION, HEATING PRODUCTS AND ACCESSORIES

The effect of refrigeration on the qual-

cant loss of quality. *In general,* nuts

The flapper doors are not, as you know,

Magnesium Chloride Suitable As A Refrigerating Brine?

QUESTION NO. 1149: Why are brines always made with calcium chloride or sodium chloride? Why wouldn't any salt work just as well? For example, could magnesium chloride brine be used?—H.C.D., Denver.

ANSWER: There are many factors to be considered in determining what salt to use in a brine. Three of the principal factors are cost, eutectic point, and general chemical activity. Comparing calcium chloride brine with magnesium chloride brine gives the following table.

Other factors such as availability and cost of pumping enter into the comparison, but it is clearly seen that the calcium chloride brine would be the desirable choice.—H. P. Hayes.

Brine:	Calcium Chloride	Magnesium Chloride
Cost:	Low	Relatively high
Eutectic point:	−59.6° F	−27° F
Chemical activity:	Relatively low corrosion	Relatively high corrosion

NAPRE

Question Box

The National Educational Committee, NAPRE, answers monthly in this column, operating problems forwarded by members. The Committee appreciates answers from the field. Address questions and answers to Prof. Harold P. Hayes, Dean of Engineering, State Polytechnic College, San Luis Obispo, Calif.

What Difficulty Can Occur By Oversizing Pipe Systems?

QUESTION NO. 1150: From time to time you have published questions on pipe sizes and how to check for undersized piping. I have two questions. First, is oversized piping harmful in any way? Second, can you show a specific example of a typical system and how pipes in that system should be sized?—J.A.K., Chicago.

ANSWER: On ammonia systems oversizing of refrigerant lines can be harmful in no way. On the other hand, undersizing of ammonia refrigerant lines will result in a reduction of capacity.

On Refrigerant-12 systems oversizing is seldom experienced except where the compression system is arranged for considerable reduction of capacity; such as with multiple compressors, cylinder by-pass control, or with speed reduction of the compressor. In such cases the lubricating oil may not return satisfactorily to the compressor at reduced capacities.

The best method of insuring the return of lubricating oil to the compressor crankcases under such circumstances is to use a discharge line oil trap. While discharge line oil traps are not 100 percent effective in separating lubricating oil from the refrigerant they are sufficiently effective so that the small portion in circulation readily returns to the compressor under nearly all conditions of operation.

The York Corp. "Equipment Manual" makes the following suggestions with regard to Refrigerant-12 line sizing:

Discharge Lines

a)—*Maximum discharge line* gas velocities recommended for equivalent lengths of 150 feet or less are shown in table.

b)—*Total friction loss* for discharge mains of 3 psi is considered good design but not an absolute limitation.

Pipe Size	Velocity, ft/min
2″ and smaller	1000
2½″	1100
3″	1200
4″	1300
6″ and larger	1500

Suction Lines

a)—*Total friction loss* for suction lines of 0.5 to 1.0 psi per 100 ft equivalent length is good practice but not an absolute limitation. Lower operating suction pressure should have suction lines designed for lower pressure loss. It is necessary in many cases to use a larger suction line than initially selected in order to prevent a penalty on compressor capacity.

Liquid Lines

a)—*Total friction loss* for liquid lines in the absence of liquid subcooling of 5.0 psi is considered good practice but not an absolute limitation. Excessive liquid line pressure loss reduces the liquid capacity of the line, as well as the liquid pressure at the expansion device and, therefore, reduces the pressure differential.

b)—*Maximum velocity* in liquid lines equipped with snap-action control valves is 300 fpm.

c)—*Maximum velocity* in liquid lines between condensers and receivers is 100 fpm for a through type receiver and 200 fpm for a surge type receiver.

d)—*Minimum size* liquid or gas connections to auxiliary apparatus such as liquid coolers, surge drums, etc., is the size of the float connection itself.

e)—*Multiple condenser* applications require a liquid header to join all the liquid outlet condenser connections. The area of this header should equal the total area of all the liquid outlet connections. The size of the header should not be reduced until the line goes into a vertical position and has dropped down at least one foot.

When the discharge line oil trap is not used caution must be exercized, with regard to piping layout, that oil will not settle in the lines and coils. This topic has been the subject of many treatises, two of the later ones being:

a.) Goddard, M.B.; "Freon-12" Refrigerant Pipe Line Sizing. Refrigerating Engineering, August 1950, p. 753.

b.) Leegard, C.W. and Dodson, W.E.; Fundamentals of Refrigerant Piping For "Freon-12" and "Freon-22" Systems. Refrigerating Engineering, May 1952, p. 473.

These two papers give many valuable suggestions for avoiding a wide variety of piping difficulties.—C. E. K., San Luis Obispo.

Reduce Unit Capacity By Change of Refrigerant?

QUESTION NO. 1151: We are operating a 10 ton Refrigerant-22 package unit. It is oversize for the job. If we restrict the air being delivered we have coil freeze up. I would like to switch to Refrigerant-12 to reduce the capacity of the unit. What would have to be taken into consideration in making the change? Is it practical?—K.M.D., Chicago.

ANSWER: It is possible to convert a Refrigerant-22 package unit for use with Refrigerant-12; however, certain changes and adjustments would need to be made.

The expansion valve would need to be changed to one suitable for use with Refrigerant-12; since the pressure-temperature characteristic of the fluid in the thermal bulb would not be suitable, and also, the orifice size would be a little small.

The high pressure cutout would need to be reset for the new refrigerant.

The oil would need to be removed and a new charge installed.

Both liquid and suction lines would probably be a little small, but since efficiency is not the problem, little difficulty would probably be experienced.—C. E. K., San Luis Obispo.

Wants proof of Infestation Protection By Cold Storage

QUESTION NO. 1152: INDUSTRIAL REFRIGERATION, November '56, states on page 35 that refrigeration is the safest and surest way to protect nuts and dried fruits from insects. Can you prove this? What temperatures are necessary to accomplish this?—California Rancher.

ANSWER: I would not want to guarantee that refrigeration is the best possible way to protect nuts and fruits from insects, but it is highly satisfactory. Tests conducted by he U. S. Deparment of Agriculture have shown that insect infestation in nuts can be prevented by refrigeration at temperature below 50 F.

For dried fruits (in air) storage at 40-50 F retards and controls insect infestation. At lower temperatures control is better and experimens have been conducted at 0 F to demonstrate that that killing takes place within a few hours.

the tubes also lowers overhead costs. The

it might eventually become a standard

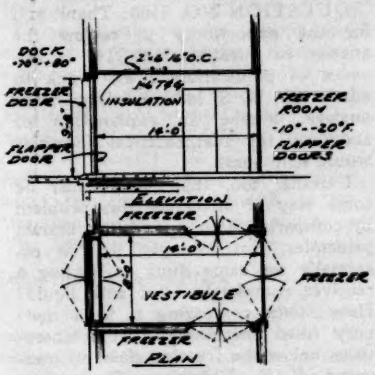
Since I recommended the coils, I

The effect of refrigeration on the quality of nuts and dried fruits should not be overlooked. Proper refrigeration of these products enables them to be held in storage for several months with no significant loss of quality. *In general,* nuts should be stored at 32—36 F and 65—70 percent relative humidity. Dried fruit should be held at 32 F and 55 percent relative humidity.—H. P. Hayes.

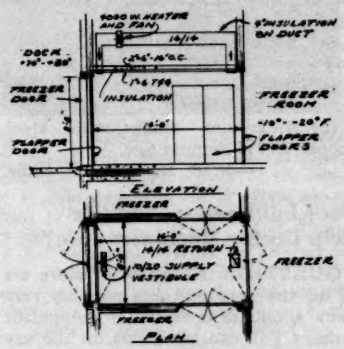
Cold Room Vestibule Icing Partly Defeats Design Use

QUESTION NO. 1153: Members of NAPRE and other IR readers may be interested in a problem we had to solve recently. In one of our plants, the vestibules were "air-conditioned" but they were not insulated. We had constant trouble with ice on the vestibule floors causing our fork-lifts to slip and slide. We also had ice on the auto-close doors into the freezer room causing them to stand partly open.

We found a good solution and are wondering if other members or readers would have solved this problem in the same way. Why don't you publish this in the Question Box and see what answers you get? I will be glad to send my answer if you want it.—C.A.C., Memphis.



BEFORE



AFTER

ANSWER: We insulated the vestibule walls and ceiling, then installed a galvanized metal duct, insulated it. Installed a 4 KW electrict heater in the duct with a fan blowing air through the heater. We pick the intake air up at the colder end of the lock and discharge the warm air as shown on the sketch.

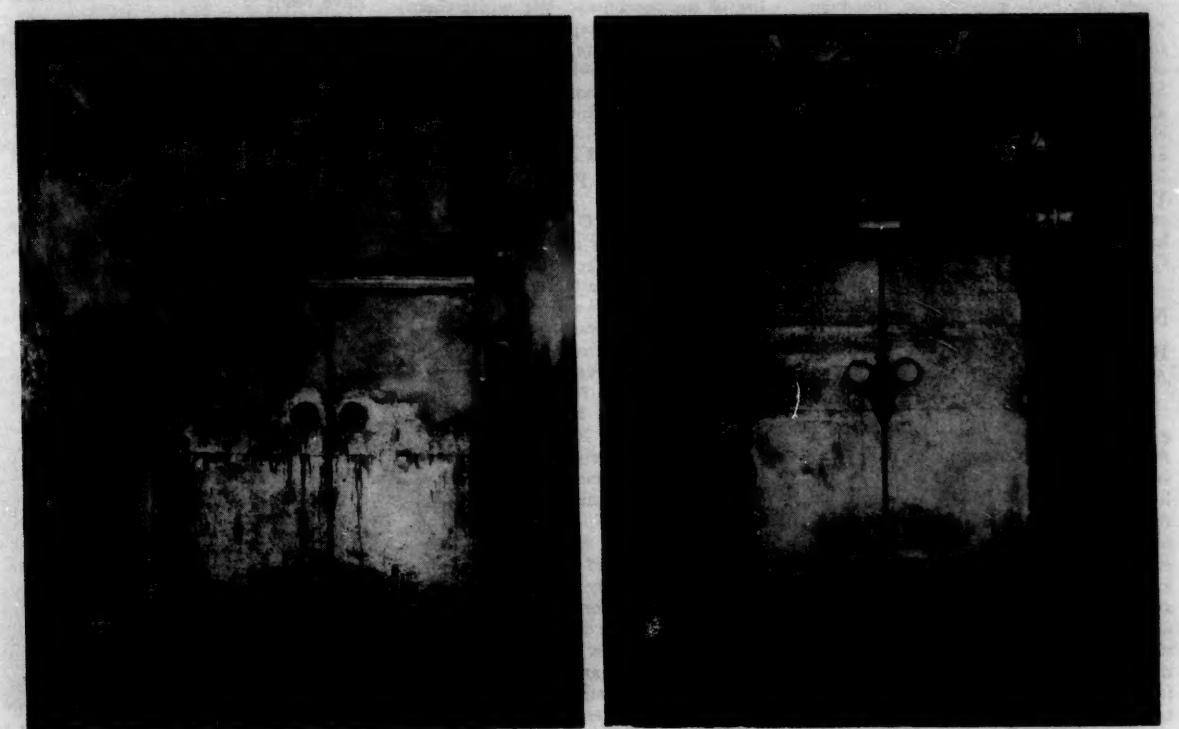
The flapper doors are not, as you know, perfectly tight. I say the warmer air is lost out through the flapper door on the dock side. Some may pass on the room side but moisture-laden warm air is actually kept out of the vestibule. The heater is controlled by a thermostat. The vestibule runs about 40 F.

I got the idea from a 75-watt electric globe that burns in the vestibule. For about three feet around this light the wall and ceiling was free of condensate or ice at all times. The heat from the globe did it. (See photos taken in vestibule, one with and one without the heater.)—Chas. A. Conley, Mid-South Refrigerated Warehouse Co., Memphis.

Heat Exchanger Cleaning Job Eased By Short Piece of Pipe

QUESTION NO. 1154: In our plant we have several old time open shell type water cooled heat exchangers for condensing our ammonia. Although we have a regular maintenance schedule that calls for brushing out these tubes, over a period of time they have gradually scaled up somewhat. Can you recommend some practical means of cleaning these tubes with a conventional tube cleaner with a mechanical cutterhead? We want to keep the condensers on the line while we perform this cleaning operation.—W.O.R., Chicago.

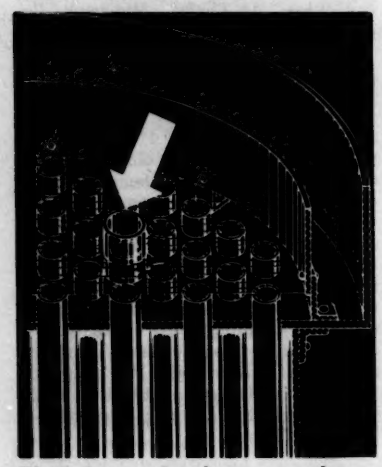
ANSWER: The old-time open-shell-type water-cooled heat exchanger still being used in many plants can be kept effective through periodic cleaning. The lower head pressure obtained by cleaning



At left is a view of an ice-laden vestibule to a minus 20 F room. At right, an adjacent air lock with a 4 KW heater system installed. Note lack of moisture in the vestibule with heater.

the tubes also lowers overhead costs. The relative age of this equipment should not lead to its neglect. The following tip on cleaning the tubes of such units allows maximum tube-cleaning speed and efficiency wiithout taking the heat exchanger off the line.

First, cut a piece of pipe so it is several inches longer than the tube projecting above the tube sheet. The pipe should be large enough to let a hand enter. Then place the pipe over the tube to be cleaned, as shown in the sketch. The tube forms a cofferdam that keeps most of the water from flowing down the tube.



Pipe sleeve placed over condenser tube serves as coffer dam during cleaning periods.

The absence of water in the tube reduces the back pressure on the tube-cleaner motor and permits greater power to be delivered to the cutter head, brush, or other accessory. The result will be higher operating speeds. In addition, the absence of a large volume of water will eliminate the cushioning effect on cutters and the large frictional drag encountered in underwater tube-cleaning operations. The operator will also be happier, because water will no longer be splashed in his face as he cleans the tubes.—Thomas C. Wilson Inc., N.Y.

New Questions

Butter Storage Temperatures Asked By Aussie Readers

QUESTION NO. 1155: There is a great deal of controversy going on in Australia at the moment in regard to storing butter at minus 5 F for better keeping qualities. Some persons in Australia say that this is the general temperature of butter kept in cold storage in U. S. A. Both in Australia and New Zealand the general temperatures for storage of butter for local and export requirements is from 10 to 15 degrees F. We have found over the many years that this gives satisfactory results, and there is no deterioration in the quality of the butter.

However, as this question has been raised from time to time in Australia, it might eventually become a standard practice for butter to be stored at lower temperatures, the same as reported in U. S. A. If you could supply us with bona fide information in regard to what temperatures butter is stored at in U. S. A. it would be very much appreciated.—J. W. M., Brisbane, Australia.

Seeks Heat Transfer Data For Various Finned Coils

QUESTION NO. 1156: Where can I find information published on heat transfer through finned tubes? Data sought is for tubing manufactured with a serpentine type fins, and for varying space dimensions between the fins.

(a) Steel tubes with steel, copper and aluminum fins.

(b) Copper tubes with steel, copper and aluminum fins.

(c) Aluminum tubes with steel, copper and aluminum fins.

—B. B. B., Lashkar, India.

Does Lubrication Additive Help Reefer Machinery Life?

QUESTION NO. 1157: Before we go off the deep end and possibly ruin some ammonia compressor equipment perhaps you can advise us on the use of colloidal graphite in the lubrication systems of both booster and high stage units. We have recently received literature on the use of this material in the lubrication of machinery in the automotive field. The manufacturers claim that the graphite doubles the life of the equipment. We wrote them asking for their experience and they replied that graphite is inert and from their tests it will neither affect nor be affected by ammonia.—R. W. F., Green Bay.

Worried About Corrosion In Aluminum Coil For NH_3 Plant

QUESTION NO. 1158: Our firm recently installed a new system which has six large blower coil units. Piping in these units is all aluminum.

From my past experience in the service field it was considered important to avoid the use of ammonia in methyl chloride systems. Since reading Question No. 1111 and the answer by J. A. McI. in the June issue of Industrial Refrigeration, I am now wondering whether or not the use of these aluminum blower coils in our ammonia system may lead to difficulty.

Aluminum pipe in the coils themselves does not lead me to believe that we should use any inhibitor, or that the alkaline ammonia would corrode them. My concern is over the soldering acids and other chemicals used in the construction and testing of the refrigeration system. Is there sufficient acid in soldering materials that could be carried into these coils or reside in them from their manufacture, which would result in corrosion? Since I recommended the coils, I would feel responsible if corrosion of this nature would take place.—A. J. O., Springfield, Mass.

Wants "Eutectic" Defined

QUESTION NO. 1159: Can you give me a simple explanation of the meaning of "eutectic"? I have seen it used in discussion of brines and also in welding applications. What is the basic principle of a eutectic?—J. P. W., Chicago.

Asks Simpler Definition On Force Exerted By Ice Lense

QUESTION NO. 1160: Thank you for the opportunity to review the answer to question No. 1147 in advance of publication. I am frank to admit that N. S. lost me early in the answer. Maybe an explanation of some of the mathematical formulas would help some.

I think, too, that there must be some way of analyzing this problem by comparing it to some better known principles. For example, isn't it essentially the same thing as heating a receiver completely filled with liquid? How about comparing it to a mercury filled thermometer at temperatures below the freezing point of mercury?—E. F., Venemann Chapter.

[Editor's Note: IR's Technical Editor slipped when preparing the answer for the printer, which probably helped the misunderstanding. That answer which appeared on page 38, January IR, center column should have read:

Compressibility of ice is defined by the formula

$$B = \Delta V / Vo \ (1/\Delta P)$$

where,

B = the compressibility
ΔV = the change of volume (cu. ft.)
Vo = the original volume (cu. ft.)
ΔP = the change of pressure (Atmospheres)

Sorry the ΔV and ΔP were omitted just ahead of the equal signs. —JRK]

New ASRE Standards

ASRE Standard 29-56 "Methods of Rating and Testing Ice Makers" is available as revised from headquarters at 75 cents per copy. In addition to clarification of basic terms, information on a method of calorimetry is included.

Standard 35A-56 "Method of Testing Dessicants for Refrigerant Drying" gives purpose, classification and definition of terms, apparatus, preparation and analysis, procedures and handling of data. It may also be obtained at 75 cents per copy.

ASRE Standard 35B-56 "Methods of Rating and Testing High Side Liquid Line Driers" for use with Refrigerant 12 or Refrigerant 22 is available at $1.00 per copy.

News Notes and Chapter Activities

New Meat Plant "Down Under" Described By Member-at-Large

DETROIT—Some very interesting refrigeration applications are developed through NAPRE correspondence with Members-at-Large. Vice-president Frank L. Chase recently forwarded an informative letter from H. J. Taylor of Taylor Engineering Pty., Ltd., Brisbane, Australia. Chase had corresponded in September on a tip that Taylor had done a special freezer tunnel for a meat by-products plant.

Taylor not only provided data in some detail, plus photographs and floor plan of the meat plant, but volunteered as well some help for the member who submitted Question No. 1129 in the October '56, Industrial Refrigeration ("More Humidity for Meat Cooler"). He also enclosed a copy of a paper which he had developed before the Queensland Branch of the Australian Institute of Refrigeration on "The Application of Finned Evaporators".

Offal Blast Freezer Plant

"Casino is a town in the Northeast corner of New South Wales, about 350 miles north of Sydney. A co-operative meat company is in operation which processes beef, pork, and calves, mostly for the Australian market. It recently installed two blast freezing units to handle edible offal. One freezer processes for export to the United Kingdom and the other for local consumption. More recently two additional blast freezers were installed to handle meat cuts packed in polyethylene bags and cartons.

"The Northern Co-operative Meat Company, as this firm is known, is looked upon in Australia as being one of the most up-to-date meat packing houses. A few years ago it began a program of modernization in all departments. Its chilling-freezing equipment is of the most modern and up-to-date type in those sections of the plant which have been converted from the older brine spray type of equipment to finned dry surface evaporators.

"Fig. 1 is an overhead view in one of the new beef chillers which is equipped

Fig. 3 — Exterior view of offal freezing tunnel at Northern Co-operative Meat Company. Each section of the tunnel is equipped with small access door which permits sliding trays of the product into the tunnel. Dry type fin coils are fed liquid refrigerant by the surge drum pictured at the right. Air is delivered off the coils to the end of the tunnel and then passed back through an overhead section of the tunnel.

with three overhead Taylor quad finned chilling units. Each of these units delivers approximately 22,000 cfm through Anemostat air diffusers directly over the beef. The units are flooded through individual horizontal surge drums. The beef is chilled from body temperature at about 103 F to bone temperature of about 40 F in 16 hours with an overall shrinkage of approximately 1½ percent.

"Fig. 2 is a photograph of a combination pork or calf chiller fitted with six Taylor wall mounted chilling units. This chiller can also be used for chilling calves and can as well be used for blast freezing pig or calf bodies.

Dry Surface Tunnel Evaporators

"Outside of one of the offal freezing tunnels is pictured in Fig. 3. This particular tunnel handles 12,000 lbs. of edible

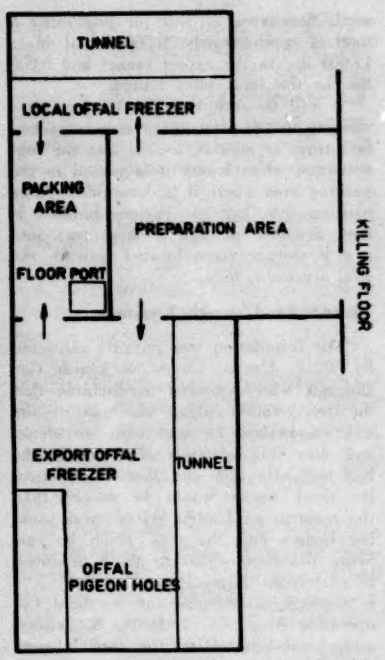


Fig. 4 — Floor plan of new plant freezer tunnel and product handling rooms.

offal per day. The product is packed in trays or in cartons and is loaded into the tunnel through a compartment door onto shelves. The small products such as kidneys and brains are frozen in 1½ to 2 hours, and large products such as ox hearts are frozen in approximately five hours.

"Air at about minus 10F and at a speed of approximately 1200 fpm is discharged past the product by a Taylor finned dry surface blast freezing unit located at one end of the tunnel. When the air has passed through the packed section of the tunnel it is returned over the top section of the blast freezing unit. The ante-room section adjacent to the tunnel is fitted with a Taylor wall mounted unit to maintain an air temperature in the space of about 0 F.

"Sketch in Fig. 4 shows the layout of the preparation and packing area which is located adjacent to the killing floor. A feature of the layout is that a relatively

Fig. 1 — Three ceiling hung air diffusers of the dry fin type used in the beef chiller at Casino, Australia. Note the walk-way for access to the units, and tubular construction for meat rails.

Fig. 2 — Calf chiller view shows floor mounted air diffuser units which utilize dry type fin coils for evaporative surfaces. The room may be used also for blast freezing of pigs or calves.

small floor area is used for processing a total of approximately 20,000 lbs. of offal; 12,000 lbs. in the export tunnel and 8,000 lbs. in the local offal tunnel.

"It will be seen that the product after washing in the preparation area is packed into trays or moulds, loaded into the tunnels, and when frozen it is passed to the packing area where it is demoulded. After packing into bags or cartons product is then dropped through a floor port into a 0 F storage room located beneath the offal processing area.

Visited By Chicago Engineer

"The installation was recently inspected by W. F. Hagen, Union Stockyards Co., Chicago, who expressed the opinion that the refrigeration plant was one of the most up-to-date he had seen anywhere, and also was certainly the cleanest he had seen. He also said that this particular meat works would be larger than the majority of United States' meat packing houses and the pigs which he saw being processed equal to those produced by American farms.

"General Manager of the Northern Co-operative Meat Co. Ltd., A. S. Jeffrey, under whose direction the tunnels were designed and installed, is extremely pleased, not only at the speed of freezing and the small space occupied by the processing rooms and equipment, but by the high quality and excellent bloom of the finished products. Although none of the product is pre-packaged in vapor resisting bags, there has been no sign of freezing burn and the bloom has been far superior to that which is normally obtained in sharp freezers. The overall shrinkage from hot to frozen is only approximately 1½ percent. Consultant for the meat company was Jas. Budge Pty. Ltd., Sydney."

M-A-L Remittances

Dues from member-at-large category in NAPRE have been received at a very furious rate at National Headquarters. It was reported that the national office has had some difficulty keeping pace since they are short-handed. Therefore, this classification of members are requested to "sit pat" and they will receive their membership cards and acknowledgments within a few weeks.

Among the first remitting were members like H. Thomas Dewhirst, chief engineer, House of David Cold Storage, Benton Harbor, Mich., William Brownlow, vice-president, Quaker City Cold Storage, Philadelphia, H. A. Reed, Director General, Fabrica de Hielo Gomez, Palacio S.A., Durango, Mexico, John A. Gealta, chief engineer, Becker Products Co., Ogden, Utah, Walter Brittain, operating manager, Crystal Ice Co. Inc., Ardmore, Okla., B. E. Smith, and Harry J. Wood, chief engineers, Fairmont Foods Division, Stokely-Van Camp Co., Fairmont and Winnebago, Minn., Lawrence J. Dooling, Bay City Freezers, Inc., Bay City, Mich., and William H. Burton, Baltimore, Md.

Windy City Tours Mart Lays Fall Convention Plans

CHICAGO—Famed as the second largest office building of this type and construction (second only to the Pentagon, D.C.), the Chicago Merchandise Mart was the scene of Chicago Chapter meeting on December 11. After the meeting which over-flowed into the storage area from the engineers' conference room, members and guests were given a tour of the refrigeration machinery room. Roland W. Branden, chief engineer, aided by NAPRE members Harry Ekeberg and E. W. Harlow, personally conducted the tours and presented a story on the plant and its operation. He went into detail on the maintenance program in force in the building and provided a few statistics concerning the refrigerating system. Details of the Mart air conditioning and refrigeration plant will be published later in a complete story of the plant scheduled for early publication in IR.

Shortly after National President Bert C. McKenna designated Nicholas M. Downes, Chicago's President, as National Convention Chairman, the Chicago group got busy on various committee assignments for the meeting to be held in the Windy City, November 18-21. A committee headed by the National President himself paid a call on several of the hotels in the Chicago area which had volunteered guest rooms and public space for the national meeting. Final selection has not been announced by the national office, but it is presumed that the hotel will be among a group located outside the loop near Chicago's South-side.

Other national organizations holding their convention concurrently with the All Industry Air Conditioning and Refrigeration Exposition at the International Amphitheatre are locating in this South-side group of hotels. Charles Taylor has been named chairman of the Accommodations Committee to work out the details with the national office and hotel choice. He is to be assisted by James A. McIlrath as vice-chairman. William F. Cody is the other member of the committee. It is expected that two more Chicago members will be added to the final make-up of this work group.

Chapter Member Promoted

According to *The U.S. Sno-Man*, published by the United States Cold Storage Corporation, the promotion of Charles S. Taylor to chief engineer of their Chicago plant, assures the Chicago operation a worthy successor to Emil Lyngklip, who recently retired from that post. Charley has been with the Chicago plant since

(Continued on page 38)

Merchandise Mart Engineer Harry Ekeberg, back to camera, answers some of the questions presented by one group of engineers touring this Chicago landmark in December. The figure in the dark overcoat is Eugene B. Kelly, vice-president of the Chicago Chapter. National President Bert C. McKenna is the gentleman in the right foreground.

Convention Accommodations Committeemen were guests of William F. Cody and management of the Hotel Sherry recently in Chicago. Chief Engineer Cody is pictured at the head of the table. National President Bert C. McKenna appears in the forward left-hand position and Earl J. McMichael, a director of the Chicago Chapter, is at the right. Other members of the committee in the background include Nicholas M. Downes, Chapter President, and National Secretary, J. R. Kelahan.

(Continued from page 27)

pressure of 100 psi. When found tight in every respect and all insulation completed, proceed to mix CaCl brine. Approximately 750 cu. ft. of CaCl brine (7½ tons) will be required.

"2. The brine will have the following characteristics:

a. S.G. 1.17 to 1.2 — or 18 lbs. dry CaCl per ft^3 at 68° F.

b. Ph 8.3 to 8.7 — adjust with hydrated lime.

c. Clear.

"3. Thoroughly wash out entire brine system by circulating clear water with the large brine pump (800 gpm) and drain clean. This operation may have to be repeated to clean out all scale, rust and other matter.

"4. Pump brine into system with small brine mixing pump until the balance tank is approximately 70% full. Then circulate brine throughout system and bleed off air at all high points.

"5. Inspect pump packing and all valve stems for leaks. Check grease cup an packing glands. Gradually tighten packing while pumps are in operation.

"6. Admit ammonia to brine coolers and build up pressure corresponding to brine temperature.

"7. The operating temperature of brine from coolers to be 20 F and the Regulator set at 30 psi. This ammonia pressure may be changed to 28 psi when the brewery is in operation.

"8. Brine must be added to system to allow for shrinkage after it is cooled.

"9. Liquid ammonia level in the receiver is to be approximately 1/3 of the glass when brine coolers are charged to the operating level. Never carry more than ½ glass in the receiver when brine coolers are operating at the desired liquid level.

"10. Ammonia controls on brine coolers are as follows:

a. Liquid level is maintained within approximately 1-in. variation by float switch on each cooler. This low liquid level will be about 2 in.'s above tubes in the cooler and is visually indicated on a liquid level gauge on each cooler.

b. The coolers are connected on the bottom with a 2 in. balancing liquid line to insure an even liquid level in both coolers, thereby maintaining the coolers at full capacity under varying load conditions. Drain valves are connected to bottom of liquid trap above the coolers so that any liquid ammonia which might pass over from the coolers into the trap above will drain by gravity back into the top of the coolers. The volume of liquid trap and head space in the coolers exceeds the volume of receiver so that it will be impossible for the system to fill with liquid and pass over to the compressors.

c. Arrangement of liquid ammonia controls will insure a temperature of suction at the compressor within 5 F of saturation, thereby obtaining the highest capacity and most economy in operation.

"11. A total charge of approximately 6000 lbs NH_3 is required. The ammonia system will be charged by attaching ammonia cylinder to the charging valve in main liquid line from the receiver. Proceed as follows:

a. Open liquid stop valves controlling solenoid valves to admit ammonia to the brine coolers. Float switches will place the solenoids in the open position until liquid ammonia rises to the desired level.

b. Open all suction valves on top of brine coolers and ammonia trap. Open by-pass suction valves on top of brine coolers and ammonia trap. Open by-pass suction around regulator. Open balance valves on coolers and drain valves on liquid trap. Adjust all valves on ammonia condens-

The "King Zeero" Recirculated Ice Water System Eliminates using an Agitator Motor

4 "King Zeero" No. E-612-W Ice Builders in use at Sturtevant Dairy Products, Rock Island, Ill.

Patented Built-In Louvers provide Automatic Agitation without power, using only the suction of the recirculating pump

- No propellers, submerged bearings, or extra pumps to give trouble.
- Sufficient velocity, turbulence and length of travel adequately cool the water on its way through the ice field.

32°-34° ICE WATER assured at all times

- The "King Zeero" delivers the COLDEST water LONGER, for less outlay. -- affords maximum economy in operation and maintenance. Smaller compressor needed lowers demand charge.

The sales representatives of the leading lines of dairy and refrigeration equipment who call on you will be glad to discuss details with you.

THE KING ZEERO COMPANY
4300-14 W. Montrose Ave., Chicago 41, Ill.

ers for continuous operation of one condenser, and set high pressure switch for one condenser to cut in at 140 psi and cut out at 120 psi. This pressure switch will control both water pump and fans in automatic operation.

c. Close king valve on receiver, then admit ammonia from shipping drum into system through charging valve and set pressure switch on compressor at 48 psi. This condition may be maintained until the brine coolers are fully charged with ammonia and the brine temperature has been reduced to approximately 32 F. Brine pump must be operating and brine circulating through the system while ammonia is being charged into system. In no case permit ammonia suction pressure to fall below 25 psi.

d. When brewery is in operation, set regulator at 30 psi and pressure switch on ammonia compressor at 27 psi on and 23 psi off. Other ammonia compressor switches will be reset at the most desirable suction pressures for refrigeration load imposed upon the system by brewing schedules.

"12. All noncondensable gases must be purged from system by the purger installed above the receiver in order to maintain a condensing pressure in relation to the liquid ammonia temperature from condensers.

"13. Oil and other nonevaporable liquids must be removed from the brine coolers, receiver, desuperheater, CO_2 condenser and oil trap at regular intervals to maintain clean evaporating surfaces and pure liquid ammonia. No oil should ever show in the receiver glass."

Human Element Still the Critical Factor

Several of the engineers who supplied their manuals for review by the NAPRE Educational Committee were questioned as to the usefulness of the publication and whether or not the material is put to practical use. Here is the reply that came from one of these engineers, a national director of NAPRE: "We have found this system useful in all of our operations. However, we find it most difficult in compelling those concerned to follow the procedure outlined. Whenever someone decides that they wish to do things on their own, we are immediately in trouble . . . ."

This remark should help the reader to conclude that even though the role of the supervising engineer is to provide operating instructions, education and information, and to diligently drill and train his personnel, his best intentions are often undone by a personality who is not acquainted with the problem or who has not given the thought or acquired the necessary experience to visualize why such "paper-work tools" came about.

Member Activities

(Continued from page 36)

1932. He started in the refrigeration division as a temperature man and was transferred the following year to clerk and assistant to Mr. Lyngklip. He served in this position until his recent promotion, with the exception of his service in the United States Navy from February 1942 to October of 1945.

Experienced Engineer

Again, according to The Sno-Man, Charley is a worthwhile individual and is extraordinarily well qualified for his new responsibilities. His thoroughness, depth of training and knowledge will lead the Chicago engineering department to further heights of efficiency as it keeps pace with the rapid progress of the industry. NAPRE members join the United States Cold Storage Corporation personnel in stating that they are proud of Charley's years of excellent service and extend to him congratulations and very best wishes!

ICE-TERIA EQUIPMENT
SPEEDS PRODUCTION — CUTS OPERATING COSTS — INCREASES SALES
BAGGER-WEIGHER
MODEL 150-B
MODEL 300
ICE ICE
AUTOMATIC VENDING STATIONS and VAULT VENDORS FOR EVERY PURPOSE.
Complete Line of Ice Scoring Machines — and Repair Parts for Immediate Shipment.
PERFECTION
ICE SCORING MACHINE COMPANY
P. O. BOX 2140, FORT WORTH, TEXAS • ED5-1258

OHIO SPECIAL ICE CANS
WELDED — RIVETED
ICE CAN GRIDS
Industrial Trucks
and Trailers
THE OHIO GALVANIZING & MFG. CO.
NILES OHIO

Michigan Entertains National President

DETROIT—A capacity crowd filled the St. Clair Yacht Club on December 19, when Michigan Chapter No. 1, held its annual Christmas party. The National President, Bert C. McKenna highlighted the evenings activities with his presence. He was accompanied by Earl J. McMichael, Chicago Chapter representative. The occasion for the National President's visit was to accept two U.S. Savings Bonds which the Detroit Chapter contributed to the Venemann Memorial Educational Loan Fund. According to President McKenna in a statement made at the time he accepted, the bonds represent, not only the largest single contribution yet made, but also tops the greatest aggregate contribution made by any individual, firm or chapter. President McKenna explained the fund and also gave us a talk on the general activities of the National Association and what he hoped would be accomplished.

McMichael was on hand to extend an invitation to Detroit to reciprocate in the patronage which Chicago had given the 47th Annual Convention in the Motor City. Chicago will be host to the 48th Convention this Fall. It was brought out in the various remarks of the evening that this was the first time Michigan Chapter ever had a National President as a guest of honor at one of their local functions.

Chicago Chapter representative Earl J. McMichael addresses the Detroit Chapter Christmas party, extending an invitation to the Detroit members to attend the convention in the Windy City in November 1957. McMichael is pictured behind the microphone with Charles M. Heemstra, Chapter President, at his left. Seated at the table are Mrs. Betty Robey and Chapter Secretary and Mrs. Adams.

At the first meeting in the new year, Januray 10, Detroit had David S. Falk, an eminent engineer to lead a discussion on evaporators and evaporative surface. Speaker Falk is considered an expert on thermodynamic properties and problems of air handling. Discussions included selection of air handling and cooling coil equipment. Unfortunately, Mr. Falk spoke from experience and could not provide a manuscript.—*L. L. Adams.*

Youth Leads NAPRE At Golden Gate

SAN FRANCISCO—New officers were chosen by California Chapter No. 1, at its regular business meeting on December 17. President elect is Charles T. Stewart, Engineer, Golden State Div. of Foremost Dairies, Inc. Vice-presidents are Robert F. McKee, Pacific Fruit Express and Robert D. Lukaris, Engineer, Theo. Hamm Brewing Co. Secretary of the chapter is Leroy Etzel, junior national past president of NAPRE. Stanley Andreasen, Assistant Engineer, Pacific Fruit Express Co. was elected treasurer, and Marshall T. J. Garlinger, Assistant Supt., Military Sea Transportation Service—Pacific, a past president, was elected Sergent-at-Arms. Stewart, McKee and Lukaris, represent a third generation of engineers actively leading this NAPRE No. 1 chapter in the State of California.

Water Treatment Speaker

Featured lecturer for the meeting held at Bruno's Restaurant was F. S. Howard, Infilco Company. Howard's talk covered all phases of water treatment operations. Preparing and treating water for use in high and low pressure boilers, hot water systems, recirculating systems, processing and ice making were the principal topics, although many questions on other water problems were asked following his presentation.—L. ETZEL.

TO SERVE YOU BETTER
a new home for
VAPO-WALL
LOW-TEMPERATURE PIPE INSULATION

Portsmouth, Ohio, marks another chapter in the Vapo-Wall success story. In just a few short years, this low-temperature pipe insulation has become recognized by the refrigeration and food-processing industries as being far superior in terms of economy, durability and insulating efficiency.

Increased demand for Vapo-Wall has increased the need for larger production facilities, convenient to eastern and midwestern markets. The strategically located Portsmouth plant was designed to answer this need. For free consultation on your insulation problems, why not contact MMM, Incorporated, today?

VAPO-WALL IS MADE OF STYROFOAM,® THE MOST NEARLY PERFECT LOW-TEMPERATURE INSULATION EVER DEVELOPED

® Trademark, Dow Chemical Co.

MMM, Incorporated
Portsmouth, Ohio

OHIO

Specify Vapo-Wall for insulation of low-temperature lines in:

- dairies
- breweries
- meat-packing plants
- food-processing plants
- chemical-processing industries

MMM incorporated

Home Office: 1315 Hutchins • Houston 1, Texas • CApitol 8-2387
West Coast: 5170 Valley Blvd. • Los Angeles 32, Calif. • CApitol 2-0300

Industrial Self-Destruction NAPRE Topic at Los Angeles Chapter Meeting

LOS ANGELES—Industrial plant safety theme at the December 5 meeting of California No. 2 Chapter, NAPRE, was "Industrial Self-Destruction". The program followed the national policy of having the various chapters, at least once a year, arrange an educational program in which plant and factory operational safety, and measures of accident prevention are stressed. The speaker was C. L. Barr, Assistant Superintendent, Field Service, California State Compensation Insurance Fund, whose background of 30 years in insurance and 20 in compensation work amply qualified him for the task.

Speaker Sets Theme

The subject of accidents in plants, the speaker pointed out, could well be designated as "Industrial Self-Destruction", for, he said, every time that an employee gets hurt it destroys just a little of the plant's efficiency and interrupts the smooth flow of operations.

Barr stressed the need of employee safety educational programs so that plant workers will know what to do, as well as what not to do in preserving their health. He cited two accidents in refrigeration plants that came to the attention of his division, and which were caused by a combination of carelessness and ignorance.

In case No. 1 a man in a San Francisco refrigeration plant climbed up the ammonia coils because he was too lazy to get a ladder from the other end of the room. The coils broke, ammonia fumes swept over him and his lungs were seriously burned.

NH_3 Coils Make Poor Ladder

"Ammonia coils", Barr remarked, "are not designed to have a 180 pound man climb up them or walk on them. The employee probably knew that, but laziness and carelessness inclined him to take the chance which wound up in the infirmary".

In case No. 2, Mr. Barr, explained, a worker wanted to blow out a line. He reached for a can of oxygen off a shelf and went to work on the line . . . It blew out, and blew him straight into a six-week's seige in the hospital.

The speaker cited what he called the "Four IMPS of Disaster":

IMP-atience . . . The man who is too impatient to put on safety goggles or safety shoes, or to make sure all valves are closed that should be closed, before he goes ahead with a job.

IMP-ulsiveness . . . (A cousin to Impatience) . . . The man who goes ahead without giving proper consideration to what should be done.

IMP-rovise . . . The man who is inclined to by-pass standard safety procedure by improving methods of his own for doing a job.

IMP-unity . . . The man who thinks he can do the wrong thing with impunity because, so far, nothing has happened to him.

Member on Arabian Job Wins Six Quarts Ice Cream!

George Paulick, pinch-hitting for Phil DeSantis, chairman of the membership committee, reported on the final outcome of Los Angeles Chapter's membership drive. He revealed that 22 members had brought in a total of 38 new members. First prize—a dandy fishing pole, reel and line—went to E. T. Quinn, who signed up seven new members. Smaller prizes went to W. A. Foster, Mike Julius, Donald Byl, Howard Carter and Flavil Register. Register won six quarts of ice cream and the problem arose as to how to get his prize to him, for Register at present is working in Saudi Arabia.

Executives Elected for 1957

New officers for 1957 were elected at the December 5 meeting. A slate of candidates submitted by the nomination committee headed by Rudi F. Kettler was elected unanimously. They are: President, Victor A. Stubblefield, Pacific Fruit Express Co.; Vice-presidents, Michael Julius, California Consumers Corp. and Guy R. King, Santa Monica Technical School; Executive Secretary, Donald E. Byl, Union Ice Co.; Treasurer, Emmett T. Quinn, Pacific Fruit Express Co., and Sergeant-at-Arms, James H. Webb, California Consumers Corp.—*Fred Herr.*

Milwaukee Announces Regional Conference Dates

MILWAUKEE—Early in January Milwaukee Chapter, NAPRE, announced the dates of April 26, 27 and 28 for the Regional Educational Conference of which they are host. The chapter petition for a regional conference to be held in the spring was approved by the NAPRE Board of Directors before the 47th Convention held in Detroit. This comparatively new chapter of NAPRE apparently has left an impression on the national officers by their enthusiasm and ambitions.

Anderson Heads Committee

The announcement of the Midwest Conference carried the information that L. J. Anderson, secretary of the chapter, would serve as chairman. Other chapter officers have taken responsibilities for various arrangement committees. John Alberte, the chapter president, will head the speaker's committee. Vice-president Harry Behmke and S. A. Tomkowiak will head the program and tours committee respectively. R. A. Graves, the chapter Sergeant-at-Arms, will serve as treasurer of the Regional Conference Committee. Headquarters for the conference is to be announced in February and the general program will be outlined at that time as well.

—*L. J. Anderson.*

Colton Studies Evaporators

SAN BERNARDINO—Evaporators were the principal subject of discussion at the December 12 meeting of the Colton Chapter held in the Santa Fe Ice Plant lunchroom. Instructor Frank J. Scherer guided the discussion, including several questions and answers that came up in the question box.

The new ice plant being built by Pacific Fruit Express at Ogden, Utah, was discussed. Several of its features which marked the departure from traditional construction and operation in industrial ice plants appealed to the members. These are the features reported in the December INDUSTRIAL REFRIGERATION. They were the use of centrifugal compressors, Refrigerant-12, sodium chloride brine and no insulation.—*H. O. Bonter.*

AMAZING BROWN VENDOR

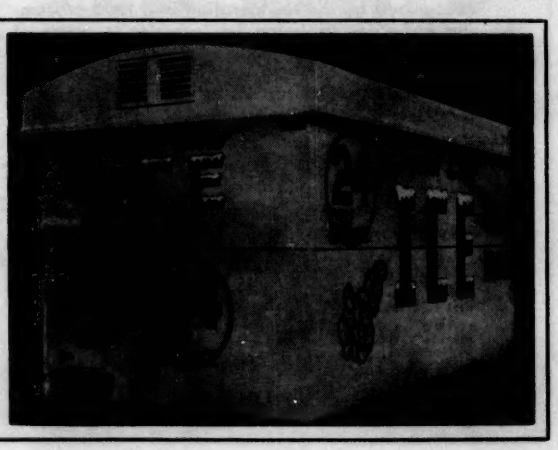
REVOLUTIONIZES AUTOMATIC ICE VENDING!

- SENSATIONAL "FOOL-PROOF" VENDOR DISPENSES CUBES, CRUSHED, PARTY AND BLOCK ICE
- LOWER OPERATIONAL COST • TROUBLE FREE • MORE STORAGE SPACE by design
- RADICAL INVENTION — IT'S NEW, DIFFERENT, PROFITABLE

ILLUSTRATED
8' x 16' Station Vends
135 — 10 lb. Bags AND
60 — 25 lb. Blocks

NEW LOW COST 6' x 8' Station Vends more than 85 — 10 lb. Bags
For complete details, specifications, prices on this Double Unit and other sizes and models or Special Applications Write, Wire or Phone

K. G. BROWN MFG. CO., INC., MATTITUCK, N.Y.



Electric Maintenance Codes, Permits at Northwest Sessions

SEATTLE—Winter meetings gave Washington Chapter members two of their best programs for the current term. At the regular meeting held in the downtown YMCA on Thursday, December 20, Bob Harrison, the chapter instructor, covered Chapter 12 of the Guy King course, on Compressor Drives. Speaker for the evening was R. K. Schumacher, maintenance specialist of the apparatus service shop of the General Electric Co.

Most important factor in maintenance is to prevent the breakdown of electrical resistance in the motor windings. Periodical inspection and suitable tests should be made. All parts should be kept clean. An interesting feature in the testing of electrical motors was introduced by Schumacher. Most all engineers know of the accepted method of testing motor wiring with an AC Megger, to infinity. A new, more accurate and foolproof, method of testing is now done by what is called a high-tension DC absorption tester which is non-destructive.

With this type of tester it is possible to more accurately determine the life of the wiring within the motor, and as high tension is used a more accurate reading can be made. At the same time the whole charge is grounded. Should the testing charge exceed the strength of the wiring no damage will be done to the motor, as the excess will be absorbed in the grounding. There are at the present time only three of these testers in the Northwest area.

To illustrate the marked progress of this type of tester over the ordinary AC tester, speaker Schumacher told of a case in which an oil tanker with electric propelling machinery was checked with the DC absorption tester. It was found that the wiring was in bad condition and it was estimated that a major breakdown could be expected within three weeks operating time. The company, however, was not satisfied with this report and called in another contractor who gave the motor an accepted AC Megger test. As an infinity reading was indicated, the tankship operator decided the motor was in good condition. However, the motor failed after two weeks at sea. The vessel had to be towed to port, spare parts had to be shipped and what with the delay, the downtime ran into hundreds of thousands of dollars.

A short description of this tester is as follows: The Tank Model 106 High Voltage Insulation Resistance Tester is a portable two-stage instrument operating from any 100 volt, 60 cycle, power source. Stage "A" may be used either separately or in conjunction with Stage "B". When used separately it delivers up to 15,000 volts DC, and when used in conjunction with Stage "B" the instrument delivers up to 45,000 volts DC. The instrument is designed primarily for testing the performance and quality of electrical insulation in high voltage equipment such as generators, transformers, cable, circuit-breakers, bushings, etc., at their normal operating voltages within the range of 500-45,000 volts.

This instrument serves fundamentally as a high voltage direct current megohmmeter. An advantage of high potential lies in its ability to detect leakage paths that do not occur at lower voltages. An advantage of DC voltage lies in the elimination of capacity effects. In good insulation the values measured are of the order of megohms. Thus, small capacity offers an impedance low enough to cause erroneous measurements with AC tests. Extremely sensitive but rugged micro-ammeters are used in this new instrument.

City Inspector Speaks

At the November 15 meeting, the speaker was Marvin Schmitz, chapter member and Refrigerating Inspector for the city of Seattle. Schmitz was invited to talk on the City Code and particularly the new amendment which has just recently come into force. The amendment makes it necessary for the owner of any kind of refrigerating plant to apply for a permit to operate the plant, the fee for the permit depending on the size of the plant. Issuing of a permit will depend on the requirements of the City Code being met. An inspection of the plant will be made by the city inspector. Condition of the

(Continued on page 44)

FASTER FREEZING RATE

preserves food flavor, color, texture

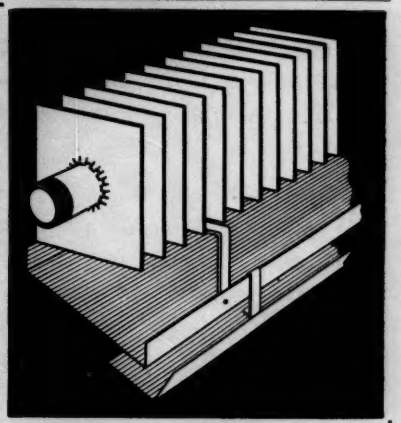
More rapid freezing and engineered distribution of turbulent frigid air throughout the system assures you maximum retention of product quality. Losses through "drying out," dessication and bacterial activity are prevented by proper sizing of units. In addition, King systems give you increased cold room capacity, continuous operation with no defrosting shut downs, lower power and maintenance costs. Whatever the type or size of your plant, a King system can be designed for your specific freezing needs by our experienced engineers.

Write for technical bulletins. More than 50 years experience is at your disposal.

THE King CO. OF OWATONNA

907 NORTH CEDAR ST. OWATONNA, MINNESOTA

This new finned pipe is available in lengths of 5', 6'8", 10' and 20' — and with fin spacings of 1" and 1½" — to fit every application.



FRICK

Square-finned Pipe

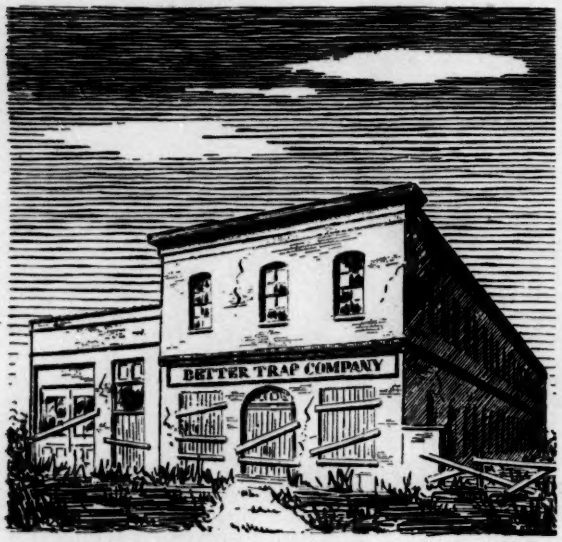
Is ideal for cold storages, freezers, food processing and meat packing plants, etc. Manufactured from 2" dia. F.W. steel pipe and 7" square 14- gauge fins, Frick finned pipe gives maximum heat transfer per dollar invested. Each fin is bonded to the pipe under tons of hydraulic pressure. All assemblies are hot-dip galvanized.

These new Frick finned coils require only one-quarter of the space needed for bare pipe having the same surface. See your nearest Frick Branch or Distributor for complete details, or write for Bulletin 158.

DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO PENNA. U.S.A.



MOUSETRAP, STEAM TRAP, SEWER TRAP

...it makes no difference

. . . the world *won't* beat a path to the door of the man who builds a better one *and then doesn't advertise it* so that people will know about his product, know where it can be bought and how much it costs.

Advertising benefits the buyer, too. It tells you the product story, makes it easy for you to buy. Even more important to you, advertising leads to mass production and volume sales . . . which means lower costs and lower prices.

Yes, "Advertising Benefits You" . . .
'specially businesspaper advertising.

INDUSTRIAL REFRIGERATION

Predicts Large Growth in Industrial Air Conditioning

WITH home, commercial and industrial use of air conditioning increasing, this industry in 1957 will break all sales records for the eighth consecutive year. Total retail volume will climb to 3-½ billion dollars it was predicted by Cloud Wampler, chairman of the board of Carrier Corporation, in a year-end review.

A further increase in total retail sales to a 5 billion level in 1961, five years hence, was also forecast by the leading spokesman for the air conditioning industry. By way of comparison, Mr. Wampler estimated the volume for 1956 at just under 3.2 billion dollars.

The carrier chief executive outlined three major areas of air conditioning industry growth:

1. Central air conditioning of residences will increase from 175,000 systems worth $262,500,000 at retail installed during the past year to 250,000 at $375,000,000 during 1957. By 1961, he predicted that central equipment would be going into residences at a rate of 600,000 installations annually at a retail value of $900,000,000.

2. The air conditioning of *existing* office buildings — which has been for many years the largest single source of "big" air conditioning contracts — hit a new high during 1956 with the market just beginning to open up wide in a number of cities.

3. Air conditioning of industrial plants for greater employee efficiency has shown a spectacular climb during the year just completed, with Carrier orders booked for this type of installation increasing 255 per cent.

"I believe we are seeing the beginning of a trend in the industrial market — one of our oldest historically — which will lead to a giant new area of endeavor for the air conditioning industry," Mr. Wampler said.

"In addition, production efficiency will be markedly affected by automation. Our nation's factories are daily installing more automatic production equipment using electronic devices which produce great quantities of heat and need temperature control to function properly."

In addition to these specific areas, Mr. Wampler predicted gains across the board in air conditioning and refrigeration sales. He forecast a rise in the relatively new business of applying packaged air-source heat pumps for year-round residential and commercial air conditioning from about 10,000 systems which will be installed in 1957 up to 30,000 annually in 1961.

In the field of room air conditioners, he said the industry was entering a period of large-volume acceptance "when the selling of such equipment has become more predictable and a stable pattern is beginning to emerge."

Although the number of brands has dropped to about half of those on the market a year or so ago, competition has not decreased, he declared.

"But it is becoming more and more the intense competition of experienced concerns, where intelligence, hard work and high quality can pay off in sales. We expect that Carrier's production of room air conditioners in 1957 will be approximately double that for this year."

He estimated room air conditioner sales at retail by the industry would climb from 1,600,000 units in 1957 to 2,150,000 units in 1961.

The Carrier executive estimated total air conditioning industry sales at retail in 1957 as follows: room air conditioners, 440 million dollars; self-contained equipment, 238 million; residential systems, 375 million; applied or "built-up" systems, 1,190 million; heating installations adaptable to air conditioning, 650 million; all other, 600 million; total, approximately 3-½ billion dollars.

Canadian Scientists Make Sub-Zero Gear Tests

DEVELOPMENT and defense of the frigid Canadian North is being worked out by a group of Canadian scientists now tackling problems created by sub-zero temperatures. Their work ranges from development of civilian and military equipment able to operate in Arctic and sub-Arctic regions to the design of buildings and clothing necessary to enable men to live and work in extremely low temperatures. Most of the research is centered in three divisions here of the National Research Council — mechanical engineering, biology and building research. Experiments already have solved many problems.

Special Oil Developed

One recent development is a special oil which can be used to lubricate machinery at temperatures as low as 65 degrees below zero. The oil was required for radar equipment, but now is being used for other military and civilian purposes.

The biology division is conducting an extensive research program to find a method to permit commercial production of frozen concentrated milk to be marketed like frozen soups. This division has also discovered why some frozen turkeys and other fowl are so tough. Extensive tests show that the meat of fowl will be tender only if the bird is not frozen until it has been dead twenty-four hours.

The mechanical engineering division operates two cold rooms in which the temperature can be dropped to 70 degrees below zero. Work now is in progress on methods to enable ground radar installations in the Arctic to shed ice. Experiments are also being made in de-icing equipment for aircraft and helicopters and to prevent jet engines from accumulating ice.

Land Vehicles Tested

Land vehicles are being tested to see how they act under Arctic conditions. This includes development of new brake fluids, greases and fuel systems. The armed services are testing new and old equipment, including development of recoil and shell loading mechanisms which will protect guns against cold weather failure.

Experiments on the development of homes and buildings which will withstand the North's sub-zero weather are being conducted by the division of building research. Studies also include construction of roads, bridges and other structures.

The lowest temperature ever recorded in Canada was 81 below zero at Snag, Yukon, in February, 1947.

1956 Frozen Peach Pack

THIS year's pack of frozen peaches amounted to 45,194,067 pounds according to a survey recently completed by the National Association of Frozen Food Packers. While this represents a decrease of about 12% from last year's 50.6 million pound pack, it exceeds any other since 1946.

Generally, regional production followed the usual pattern with about two-thirds of the pack in the west. This season, a significant decline was noted in the Midwest however, and to a lesser extent in the East and South.

The retail pack of frozen peaches was proportionately greater this year. It is noteworthy that in 1956, predominance of the thirty pound container gave way somewhat in favor of other large institutional sizes, mainly thirty-two pounds.

BOWER
BB BRAND
AMMONIA
Anhydrous Ammonia
OVER A CENTURY OF SERVICE IN CHEMICALS 1855 - 1957
PROMPT SHIPMENTS AND PURITY OF PRODUCT ARE TWO GOOD REASONS FOR SPECIFYING BOWER BRAND
HENRY BOWER CHEMICAL MANUFACTURING COMPANY
29TH AND GRAY'S FERRY ROAD
PHILADELPHIA 46, PA.

BASIC REFRIGERATION
By Guy R. King
The Book of
"Refrigeration Knowledge"
29 Chapters—340 ILLUSTRATIONS—526 PAGES
COVERING THESE SUBJECTS

Fundamentals
Compression System of Refrigeration
Refrigeration
Expansion Valves
Evaporators
Compressors
Condensers
Flow Equipment
Electric Controls and Control Valves
Lubrication
Defrosting Methods
Compressor Drives
Food Preservation
Operating
Servicing
Refrigerated Enclosures
Instruments and Meters
Heat Calculations
Humidity in Refrigeration
Compressor Calculations I
Compressor Calculations II
Refrigerant Lines—Pressure Drops
Brine in Refrigeration
Liquid Cooling
Complete Systems
Carbon Dioxide—Dry Ice
Altitude and Its Effect
Absorption Systems
The Refrigeration Code

Send For This Book—$6.00
NICKERSON & COLLINS CO.
433 N. Waller Ave., Chicago 44.

(Continued from page 41)

plant, safety appliances and proper licensing of operating personnel must all be in accordance with the city requirements.

Schmitz spoke at length on a subject of vital interest to him as he sees it in his position of City Inspector, i.e., the education of operating engineers. Schmitz himself conducts a course for apprentice engineers at Edison Technical School, which is a vocational school run under the Seattle public school system. This course consists of a four-hour period once a week, the entire course taking four years. Attendance is required and if a student fails to make regular attendance, without just cause, he is dropped from the class. Beyond this and the course of instruction provided by NAPRE, there is nothing for operating engineers.

City licenses are issued and based primarily on the safety factor: Is the holder of a license capable of operating a plant in a safe manner and in accordance with the city code? These are the prime factors required by the city but there is a lot more to it than that. An operating engineer should have a sound knowledge of the principle and practice of refrigeration. Modern industry requires trained engineers to operate plants efficiently and the better the class of engineer available to the employer, the better the status of the engineer.

New Officers Announced

Election of officers was held at the November meeting. Howard Penor and Edwin John Grainger withdrew their names from the ballot list for Vice-president and President, respectively. It was moved and carried to unanimously elect these officers for 1957: President, Robert S. Harrison, Mechanical Engineer, Boeing Airplane Company; Vice-president, Roy W. Griggs, Chief Engineer, James Henry Packing Company; Secretary-treasurer, Edwin John Grainger, Chief Engineer, Olympic Warehouse and Cold Storage, and Master-at-Arms, Anthony Wurzer, Operating Engineer, Diamond Ice & Cold Storage.

Seattle's distinguished member Clarence Hislop produced his annual ice extravaganza in December 1956. Entitled "Ice Parade" and sponsored by the Seattle Post-Intelligencer, the Seattle and King County Parent-Teacher Councils and the Catholic Mothers' Clubs, the show was produced by the Seattle Skating Club under the direction of Hislop and sanctioned by the United States Figure Skating Association. This affair is one of Seattle's big annual charity affairs. It is also one of the leading social activities in the Northwest. Hislop, a member of NAPRE for many years, operates the Ballard Ice Arena. More than 300 amateur and professional performers took part in the show which was held for three days in the Civic Ice Arena.—*E. John Grainger.*

Mid-South Elects Officers

MEMPHIS—Tennessee Chapter No. 1 elected officers for the 1957 term at its regular meeting on December 5. Elected for one year were: President, John H. Robinson, Chief Engineer, West Tennessee T.B. Hospital; Vice-president, R. E. Law, Chief Engineer, Nat Buring Packing Co.; Secretary-Treasurer, Chas. A. Conley, Sr., Chief Engineer, Memphis Cold Storage Warehouse Co. and Mid-South Refrigerated Warehouse Co.; Educational Chairman, Alvis J. Clay, Chief Engineer, Mid-South Refrigerated Warehouse Co., and Chapter Instructor, H. L. Todd.

This mid-south chapter has started the Basic Refrigeration course over once again. Instructor H. L. Todd lectured on chapter No. 2, which covers the compression system of refrigeration. He discussed the simple single-stage compression refrigeration cycle and then advanced to multi-stage systems. As usual his instructions were put across to help the chalk talk where various types of systems and hook-ups are sketched on the blackboard.

At this meeting Chas. B. Craig, Engineer, Grace Chemical, was reinstated to membership. Lewis R. McCoy, Assistant Engineer, Hotel Claridge, and Wrady E. Williams, Assistant Engineers, Hotel Claridge, were elected to membership.

Operating and Servicing

Chapter instruction at the December 19 meeting was on the topic of Operating. Instructor Todd covered this Chapter 14 showing in his discussion the economic operation of refrigerated plants, by introducing dollar and cents figures. Two factors were outstanding. Keeping the condenser clean and the correct amount of water going over or through them was emphasized over and over. The second factor of keeping evaporative coils properly filled with the refrigerant was repeated often. Of course, considerable emphasis was placed on keeping the entire equipment clean and in good working order at all times.—*Chas. Conley.*

Thermo Expansion Valves Mile-High Meeting Topic

DENVER—First meeting of the year featured a discussion by the Denver Chapter President, Mike Bistranin. The assignment, of course, was chapter 4 of Basic Refrigeration which has to do with control devices. In his capacity as instructor, Bistranin supplemented his remarks with a demonstration. He drew the complete refrigeration cycle on the blackboard and selecting Refrigerant-12 for the system, a desired 35 F room temperature and a 25 F coil, he proceeded to show the pressure-temperature relationship. Proceeding from the compressor to the expansion valve he showed the changes in pressure and temperature as the expansion valve opened and closed.

Bistranin demonstrated for the members present, how to set superheat control. By placing a thermometer at the coil outlet and another just after the expansion valve, he demonstrated how an adjustment could be made so that approximately 10 F superheat would balance the coil. These demonstrations brought forth a number of questions which the instructor answered to the satisfaction of the members present and led participants to the conclusion of another successful Denver meeting.

The December meeting featured some local Naval personnel who presented a discussion and film on heat-flow and heat transfer. Commander Camp and 1st Class Petty Officer Green from one of the local Naval activities were the guest speakers. The film itself presented some definitions of heat and its characteristics, showed how heat flows from the warmer to a colder substance.—*Gerald Hoekstra.*

NEW KRACK LOW TEMPERATURE
Electric Defrost Unit Kooler

Completely Automatic

- Fewer defrost periods needed.
- Insulated cabinet retains, circulates heat when closed . . . speeds defrosting.
- Internally wired for easy installation.

GET NEW BULLETIN ED-1055 for details and specifications!

KRACK REFRIGERATION

911 W. Lake St., Chicago 7, Ill.

25th Anniversary in Refrigeration & Air Conditioning

Wholesaler: United Refrigeration Supply. Contractor: Paletti Refrigeration Service. User: Liberty Cash Grocery Warehouse, Memphis, Tenn.

Large Freezing Plant For San Antonio

A MEAT storage warehouse of 5,000,000-pound capacity will be built on S. Brazos st. by Roegelein Provision Co., according to a newspaper report.

According to an announcement by President Roegelein, construction has begun on this new modern freezer plant.

The building will be adjacent to the Roegelein Provision Co.'s main plant in S. Brazos.

This new, completely mechanized plant it is claimed will be the most modern in the U. S., with temperature as low as minus 30 degrees.

The building is capable of holding 5,000,000 pounds of frozen meats and will be used to store Roegelein products.

In commenting on the new building, Roegelein said:

"As one of the largest users of refrigerated space in the entire south, we have found it necessary to build this huge new freezer to centralize our operation.

"Since our expansion in the purchase of an adjacent plant, we have found it necessary to store Roegelein meats in other cities throughout Texas because of the lack of refrigerated space.

Other Plants Inspected

"Executives of our company have travelled from coast to coast looking at existing freezer plants so that our new building will incorporate the latest innovations, and in a most modern design."

"This large freezer also will enable us to further expand our growing export business.

"We are at this time shipping meats to some of our Latin American friends and to a number of countries in Europe.

"Most importantly is the growing trend toward frozen, easy-to-prepare meats which homemakers are buying in larger quantities every year.

"We are ready now to enter this field which will require a great deal of freezer space.

"It is our purpose to stay abreast of the times and to take advantage of the new developments in the preparation of foods for the rapidly growing population in our trade area.

"For years we have worked to diversify our business. We have great flexibility in our beef, veal, pork, canned meats and table ready meats operations.

"This freezer will enable us to expand all of these operations on a year around basis and render greater service to retailers and consumers."

1956 Pack of Frozen Cut Corn at New High

THIS season's pack of frozen cut corn reached an all-time high of 114,813,120 pounds, according to a recent survey made by the National Association of Frozen Food Packers. This represents nearly a 10 per cent increase over the previous 105 million pound record pack of 1953.

Production was up in all regions this year, with the most significant increases being noted in the East and South and in the West. Otherwise, distribution of production followed generally traditional patterns.

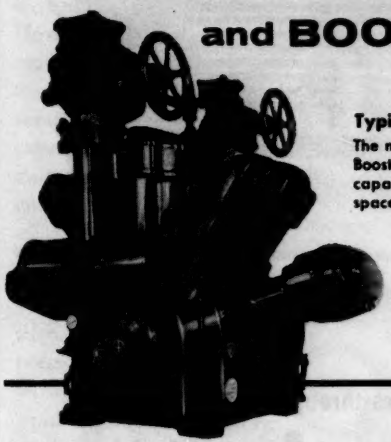
The substantial increase in the use of large, predominantly sixty pound, containers represents a radical departure from established container size usage patterns. Significant increases were also noted in the usage of 2½, thirty and fifty pound containers.

Is one of these your

REFRIGERATION PROBLEM?

☐ LACK OF CAPACITY? ☐ EXCESSIVE MAINTENANCE?
☐ SPACE? ☐ OBSOLESCENCE?
☐ HIGH OPERATING COSTS? ☐ NEW PLANT?

Investigate type "K" COMPRESSORS and BOOSTERS



Typical Example: The new CP 10 Cylinder Booster. Maximum capacity in minimum space. Ask about it!

WHETHER the most economical answer is one of the latest model CP Type "K" Compressors —a two-stage Booster-Compressor System—or a complete new refrigeration layout—you'll find a full range of capacities and models that lets you match the equipment to the job exactly. You'll get the long-term economy, solid dependability and sound engineering for which CP Compressors and Boosters are famous.

WHAT'S MORE, you'll get the extra benefits of CP "Job Engineering"—the advanced "know-how" that CP Engineering has been developing and applying for generations. It costs no more—but it can save you a lot! Write—tell us your problems—let us help you with a solution.

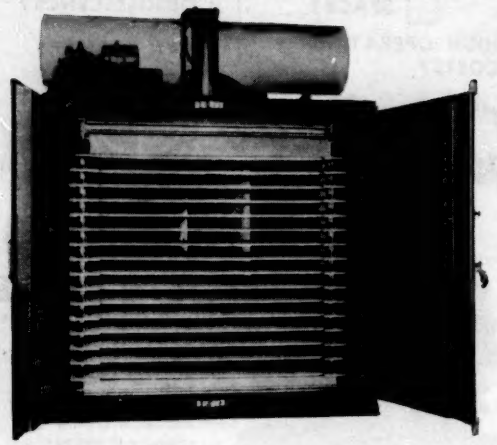
THE Creamery Package MFG. COMPANY

General and Export Offices:
1243 W. Washington Blvd., Chicago 7, Ill.
Sales Offices and Branches in 23 Principal Cities

Creamery Package Mfg. Co. of Canada Ltd.,
267 King Street, West Toronto 28, Ontario

THE MARK OF DISTINCTION IN REFRIGERATION EQUIPMENT

NOW! FASTER FREEZING OF PACKAGED FOODS!



●

"Pass-through" operation

●

DOLE patented Vacuum Cold Plates

●

Available with or without cabinet

●

Ammonia, Freon or brine models available

DOLE REFRIGERATING COMPANY
5938 NORTH PULASKI ROAD, CHICAGO 30, ILLINOIS
103 PARK AVENUE, NEW YORK 17, N. Y.
In Canada: Dole Refrigerating Products Limited
44 Elgin Street, Brantford, Ontario

WRITE FOR ENGINEERING CATALOG SECTION FE

DOLE THE Cel LINE

Freze-Cel DOUBLE CONTACT PLATE FREEZER

Ultra Cold For Fuel

THE United States air force has agreed to explore a revolutionary theory that a new type of super atomic energy can be released by making atoms extremely cold instead of hot, according to a new report.

The originator of the concept, navy scientist Robert Leon Carroll, 40, said he is confident his theory will prove out—and will make possible space flight literally faster than a flash of light. He said the fuel could be some ordinary and inexpensive material, possibly even common sand.

Faster Than Light

Carroll's theory challenges two long-accepted scientific concepts—first, that 459.6 degrees below zero Fahrenheit is "absolute" zero, and second, that the velocity of light, 186,300 miles a second, is the fastest speed theoretically attainable. He told a reporter he is confident manned space flight exceeding the speed of light ultimately will be attained with his concept.

Opposite of Fusion

If the "cold" nuclear power which he envisions is available, Carroll said, "the velocity of light can be exceeded by a rocket."

The air force has agreed to conduct an experiment along lines proposed by Carroll into the nuclear effects of extremely low temperatures.

Carroll is dean of academics in the pilot training division of the naval air test center at Patuxent River, Md. He characterized his proposed process as the exact opposite of atomic fusion, as in a thermonuclear explosion. Fusion requires intense heat.

Carroll theorizes that as an atom gets colder and colder and becomes less active, its electrons gravitate toward the nucleus and at the same time are forced by this construction to move faster and faster.

If the atom becomes cold enough, he believes, the electrons would plunge into the nucleus and disintegrate it, releasing the entire energy of the nucleus.

South Africa Fish Freezer

A LARGE quick-freezing and cold storage plant has been opened at Cape Town Africa by Irvin and Johnson Fish Products, Ltd., which recently succeeded the National Trawling and Fishing Company. Cape Town is the leading center of the fishing industry in South Africa.

Eight freezers of the plate type, capable of handling a total of four and one-half tons of fish fillets per hour, are connected to three 8 x 8 Frick compressors. There are four storage rooms, each of 10,000 cubic feet capacity, which are held at temperatures between zero and minus 10 F. by a 7 x 7 compressor under full automatic control. The ammonia compressors were supplied by the South African General Electric Company.

Modesto Plant Expansion

PLANS to expand the Modesto plant of Merchants Refrigerating Company of California at an estimated cost of $500,000 has been announced by Manager Charles H. Condrey. Construction will begin in January. When completed the plant will have freezer storage space of approximately 32,000,000 pounds and freeze capacity of 800,000 pounds daily. The company operates nine plants in addition to Modesto. The current expansion will be the third facility addition since the plant was purchased from the Modesto Refrigerating Co. in 1953.

Refrigeration Helps Keep Blimp Airborne

HELPING Navy Blimps to stay up is the mission of this portable helium purification trailer, one of six built for the U.S. Navy by the York Corporation subsidiary of Borg-Warner. After a certain length of time, the helium used to keep a blimp aloft becomes impure and must be repurified. A gasoline engine drives a compressor which draws the impure helium from the gas bag, purifies it by passing it over drying beds and then further purifies it by condensing the helium through a refrigeration system. The helium is then either returned to the gas bag or put into storage for use at a future date. Compressors, engines, pumps and cooling tower are at right in photo above, while drying beds are in large square structure at left.

Portable Trailer for Servicing Navy Blimps

COMING CONVENTIONS

INDIANA-OHIO-MICHIGAN ICE ASSOCIATIONS
February 24-27, 1957
Detroit-Leland Hotel, Detroit, Mich.

INTERNATIONAL HEATING AND AIR CONDITIONING EXPOSITION
February 25 - March 1, 1957
International Amphitheatre, Chicago, Ill.

NORTH CAROLINA ICE ASSOCIATION
March 18-19, 1957.
Washington Duke Hotel, Durham, N. C.
Lewis H. Powell, Secy-Treas.

AMERICAN WAREHOUSEMENS ASSOCIATION
April 1-5, 1957
Chalfonte-Haddon Hotel, Atlantic City, N. J.
Wm. Dalton, Secretary

NATIONAL ASSOCIATION REFRIGERATED WAREHOUSES
April 1-5, 1957
Chalfonte-Haddon Hotel, Atlantic City, N. J.
Wm. Dalton, Executive Vice-President

AIR CONDITIONING & REFRIGERATION INSTITUTE
May 5-8, 1957
The Homestead, Hot Springs, Va.

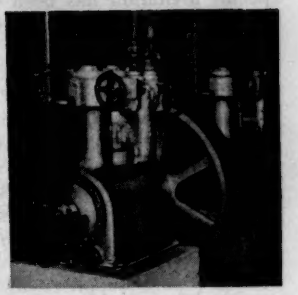
CANADIAN WAREHOUSEMEN'S ASSOCIATION
May 13-16, 1957
Harrison Hot Springs Hotel
Harrison Hot Springs, British Columbia

AMERICAN SOCIETY REFRIGERATING ENGINEERS
June 2-5, 1957
Hotel Fountainebleau, Miami Beach, Fla.
R. C. Cross, Executive-Secretary.

IN REFRIGERATION
it Pays to Know
HOWE

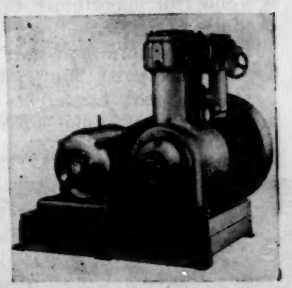
COOL IT —

with one or more of Howe's complete line of modern space-saving automatic ammonia compressors. Sizes — 2 to 150-ton capacity. Built for maximum service with minimum cost.



FREEZE IT —

with Howe Booster Compressors. Food freezing techniques to meet today's rigid requirements. Can be engineered and built to your local plant conditions with equipment manufactured by Howe.



HOLD IT —

A complete line of high efficiency unit coolers, polar circle coils, fin type coils — designed to handle any size of storage cooler or storage freezer. For preserving fresh and frozen foods.

Write for literature

CONTRACTOR-DISTRIBUTORS — *Several exclusive territories still open. Your inquiry invited.*

HOWE ICE MACHINE CO.

Since 1912, manufacturers of ammonia compressors, condensers, coolers, fin coils, locker freezing units, air conditioning (cooling) equipment.

2829 MONTROSE AVE. · CHICAGO 12, ILLINOIS
Distributors in Principal Cities. Cable Address HIMCO Chicago

Ohio-Indiana-Michigan Second Annual Convention

DUE to the tremendous success of the 1956 joint Ohio-Indiana-Michigan convention, the Directors of each Association voted unanimously to return to Detroit in 1957, meeting there at the Detroit-Leland Hotel, February 24-27, 1957. The Convention Committees met in Detroit October 23 when detailed plans were developed for what promises to be one of the finest conventions in recent years.

In 1956 a number of Canadian ice men were present, and this year a special invitation has been extended to the Canadian Association of Ice Industries. Also, in 1956, ice men from the Illinois Association, the Chicago District Association and the Wisconsin Association were present and they have been invited to return.

The Joint Convention attracted many industry suppliers, who brought with them most interesting exhibits of products vital to the ice industry. It is expected that 1957 will see more suppliers in Detroit, which will give ice men in this area a wonderful opportunity to see new products available.

The Convention will start with the Get-to-gether party Sunday night.

The regional Conference will be held Monday afternoon February 25.

Southwestern Convention

THE Southwestern Ice Manufacturers' Association held its sixty-sixth annual convention at the Hotel Adolphus, Dallas, Texas, November 25, 26 and 27.

The business sessions were almost entirely conference meetings. The Monday sessions concentrated on local problems and interests. General Weatherred served as moderator. Most of the Tuesday meeting was devoted to a NAII Regional Conference moderated by C. P. Austin. Topics of national scope and concern to Texas Icemen were considered.

Company business brought NAII President E. L. (Pop) Gunn, Jr. to Texas at the time of the Convention. He attended part of the meetings and appeared informally on the program Tuesday. The Convention was closed by former Congressman Ed Gossett, now General Counsel of the Southwestern Bell Telephone Company.

Tom D. Meacham of Monahans was elected president. Ben I. Cole of Dallas was elected first vice-president and Johnny Hayes of Marshall was elected second vice-president. Ewing Capers of Dallas was re-elected treasurer, Burdette Binnings of Dallas was re-elected secretary-assistant treasurer, and P. A. Weatherred, counsel.

Delta States Convention

THE DELTA States Ice Association held its annual convention at the Arlington Hotel, Hot Springs, Arkansas, December 2, 3 and 4.

The highlights of the Monday session included the showing of some beautiful Arkansas recreational films, an address by NAII Executive Secretary, Guy W. Jacobs, and one by Charles T. Evans of the Arkansas Power & Light Company.

The Tuesday session consisted of a humorous opening address by Louis E. Throgmorton, vice-president of the National Life Insurance Company of Dallas, Texas, followed by a NAII regional conference. C. P. Austin moderated the conference.

NAII Regional Conferences

THE regional conference program of the National Association of Ice Industries started with a meeting January 20-22 at the Parsonian Hotel, Parsons, Kansas. Other conferences are scheduled as follows: Detroit Leland Hotel, Detroit, Mich. February 25-27; British Columbia, Victoria, B.C. March 14-15; Washington Duke Hotel, Durham, N.C. March 18-19; Henry Grady Hotel, Atlanta, Ga. March 25.

DEMON MOISTURE
can't get to your insulation...
when it is erected with cold-applied ENAMELITE®

Here you see a "demon"-stration of what can't happen to rigid-type, low-temperature insulation when it's properly erected with ENAMELITE No. 330. Moisture-vapor penetration is effectively stopped by Enamelite's dense, adhesive bond.

Performance records on job after job over a 25 year period prove that Enamelite helps maintain the efficiency and life of the bonded insulation indefinitely.

Conveniently cold-applied Enamelite maintains its volume constancy, develops a bonding strength many times actual requirements to adhere insulation to walls and ceilings, and forms a permanent, moisture-vapor barrier.

DO YOU HAVE A COPY OF THE ENAMELITE CATALOG?
A copy is yours on request.

PRESSTITE SEALING COMPOUNDS
PRESSTITE-KEYSTONE Engineering Products COMPANY
DIVISION OF AMERICAN-MARIETTA COMPANY
3772 Chouteau Avenue, St. Louis 10, Missouri
K A P

DEATHS

Oscar F. Stauder

OSCAR F. STAUDER, sales manager of the Refrigeration Division of The Creamery Package Mfg. Company, Chicago, died suddenly of a heart attack at his home at 6437 Lakewood Avenue, Chicago, on Saturday morning January 19. He was 57 years old. Mr. Stauder is survived by his widow, Ceil Hough Stauder, three brothers and three sisters.

Mr. Stauder was a mechanical engineering graduate from the University of Illinois. After wide experience in the Refrigeration field, he joined the general sales staff of The Creamery Package Mfg. Company in 1952. In 1956 he was appointed sales manager of the Refrigeration Division of Creamery Package. He was a member of the Chicago Athletic Club.

Jacob Borin

THE DEATH of Jacob Borin occurred suddenly Monday, January 7, at his home, 19181 Berkley Street, Detroit, Mich., at the age of sixty-two years. At the time of his death he was president of Borin Brothers, Inc., one of the largest ice manufacturing companies in Michigan.

Mr. Borin was the next to the youngest of five brothers, and at the age of 15 he, with his brothers, started a family ice and coal business. The Borin Brothers Coal and Ice Company prospered, and in time became Borin Brothers, Inc., ice manufacturers. He was an active member of the ice industry and a former director of the Michigan Ice Industries Association, and his contribution to the success of the industry as a whole was very great.

During the years Mr. Borin became president of the May Realty Corporation of Detroit, and a director of Leonard Refineries, Inc. of Alma, Michigan. He had put his roots down deep into the community to which he came as a youth. He was one of the organizers and a member of Knollwood Country Club. He was a member of Pisgah Lodge of B'nai B'rith, Congregation Shaarey Zedek, Perfection Lodge No. 486, F. & A. M., the Detroit Consistory and Moslem Shrine. To the community in which he had earned success Mr. Borin gave full measure. He was a tireless worker in the annual Red Feather and Allied Jewish Campaign drives. He was also president of the Jacob Borin Foundation.

Mr. Borin is survived by his widow, Claudia; two sons, Leonard and Milton; a daughter, Mrs. Bernard Serwer; and six grandchildren. Of the original five brothers, Sam, Joseph, Nathan, Jacob and Max, only Sam and Max survive. Of the survivors, the son Leonard and brother Max are associated with Borin Brothers, Inc.

WILLIAM P. KIES, a plant supervisor for the National Ice & Coal Co. Milwaukee, died recently of cancer at the new St. Luke's Hospital. He was 51. He had worked for the National Ice & Coal Co. since 1928.

News of PEOPLE

Christensen to Direct Bureau of Training

THE appointment in December of W. C. Christensen as Director of the Department's newly established Bureau of Training and Apprenticeship, was announced by Secretary of Labor James P. Mitchell. This reorganization combines the activities of the Bureau of Apprenticeship with other Labor Department training services. Edward E. Goshen, Deputy Director, has been named Executive Director of the Apprenticeship Service of the combined operation.

Christensen, who is a past President of the American Society of Training Directors, taught in the Indianapolis high schools, and at Purdue University, and Indiana University. Prior to the Department of Labor duties, he was manager of the Training Department at Eli Lilly & Co. of Indianapolis. Goshen who has served in Department billets from Field Representative to Deputy Director, was active in Colorado labor circles.

Weinberg New President Central Cold Storage

CENTRAL Cold Storage Co. directors, Chicago, have elected Michael H. Weinberg, Sr., president, succeeding Jared W. Fox who was named chairman. Fox was president of the organization for the past 17 years. Weinberg, who is serving his second term as chairman of the board of governors of the Chicago Mercantile Exchange, was elected a director of Central in 1950. He also is president of Weinberg Bros. a wholesale poultry and egg company.

Nussbaum at Chicago Section ASRE

Otto J. Nussbaum

OPENING the 1957 schedule of speakers of the Chicago Section ASRE was Otto J. Nussbaum, Chief Engineer, Kramer Trenton Company. Nussbaum, who traveled to Chicago in record-breaking low temperatures which swept the Midwest and Eastern states in January, presented his paper "A New Principle of Automatic Defrosting". This is the paper which Nussbaum presented before his own section at Philadelphia in 1956 and won the section award.

His paper was a review of past developments and current practice in hot vapor defrost. Several defrost systems currently in use were evaluated from a practical point of view, and compared using a novel graphic presentation. A new principle of re-evaporative hot vapor defrost is introduced which utilizes as a heat source the latent heat of solidification of cold water.

Purchase Programs Ended

IMPROVED market strength has ended the need for further price support operations on lard, turkeys, and hamburgers, USDA has announced. Totals purchased under these programs were 72 million pounds of hamburger, 27 million pounds of turkey and 21½ million pounds of lard. USDA purchases of canned pork and eggs are being cut back. Purchases of these products to date are 6½ million pounds and 507 thousand cases, respectively.—NARW Quick Sheet.

Training Conference Later

THE NARW-TRRF Training Conference which had been scheduled for January 20-24 at Purdue University was postponed because of its proximity to other industry meetings. Plans for the conference at a later date will be made.

New Skating Rink for York

CITY COUNCIL, York, Pa., has awarded contract for the construction of a municipal ice-skating rink in Memorial Park, and city officials set to work on getting the job started as soon as possible.

York Central District Moves To New Suburban Site

AFTER thirty-six years at one location in Chicago, the York Corporation subsidiary of Borg-Warner is moving its central district headquarters to a recently completed ultra modern building at 5950 West Touhy Ave. in Suburban Chicago, it was announced by Stewart E. Lauer, York President. The move to the new building from 1113 Cornelia Ave., where York Central District headquarters have been located since 1920, was expected to be completed by December 31, Mr. Lauer said.

New Headquarters for the Central District of the York Corporation subsidiary of Borg-Warner is this ultra-modern one-story building at 5950 West Touhy Avenue in suburban Chicago.

A modern, one-story, completely air conditioned building containing approximately 20,000 square feet of floor area, the new York headquarters will be operated by some 70 employees. Officers for the engineering, sales and accounting departments as well as ample space for warehousing and parking have been designed to insure convenience for both customers and employees.

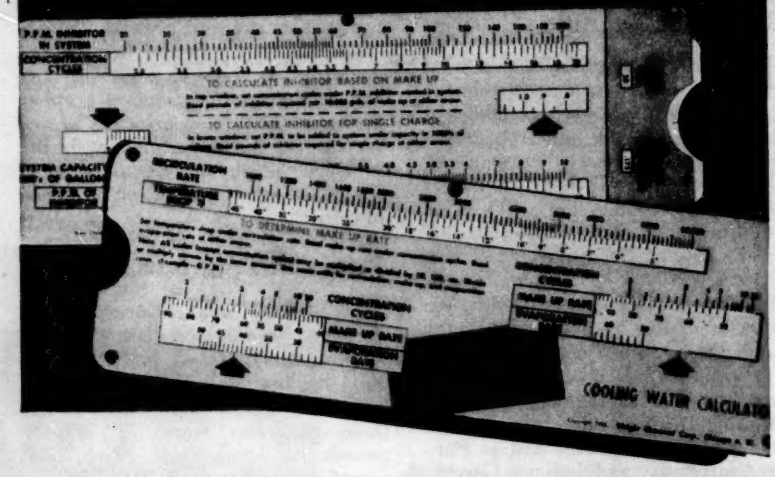
The steel frame building, with its aluminum siding, high intensity fluorescent lighting, accoustical ceiling and modern sprinkler system, is situated on a plot measuring 310 feet by 290 feet, insuring adequate space for any future expansion. A feature of the building is its sun-control system, believed to be the first of its kind in this country. Vertical aluminum louvers on the south exposure of the building will be positioned automatically by electronic controls to intercept sunlight and at the same time permit maximum natural light inside the structure. In addition to their unique appearance, the louvers substantially reduce the air conditioning load by preventing much of the sun's heat from entering the building's interior.

The building, including shop and warehouse facilities, will be completely air conditioned the year-round. In addition to providing comfort conditioning for employees, the humidity control features of the system will prevent corrosion and rusting of stored metal parts in open bins. The air conditioning system provides separate perimeter and interior area treatment. Individual office control can be obtained on the perimeter areas, separate from control of the interior spaces, which are divided into individual zones. Complete outdoor air ventilation is available for both perimeter and interior areas.

A specially designed luncheon or meeting room has been provided in the new building. This will furnish dining facilities for those who care to eat within the building and also furnishes an excellent room for district meetings and conferences larger than can be handled in the normal office layout conference room. Offices for shop, service and warehouse operations are located for ready access to these areas and to the general offices without conflicting traffic lanes. The warehouse and service area includes an overhead monorail to facilitate equipment handling. Modernized stocking facilities will speed up the handling of parts and accessories.

Architect for the new building was the firm of Friedman, Alschuler & Sincere, who retained the consulting engineer firm of Robert E. Hattis & Associates. General contractor was the Joseph T. Carp Company.

Announcing the New WRIGHT
Cooling Water Calculator



...for Efficient Cooling Water Operation

USE IT WITH OUR COMPLIMENTS to help you keep your cooling water system operating with day-to-day efficiency.

Developed by Wright Engineers, the new calculator will quickly answer these problems:

- Evaporation rate. • Determine Make-up rate.
- Amount of inhibitor required — based on Make-up.
- Amount of inhibitor required for single charge.
- Amount of acid addition required.

We know you'll find the new calculator a valuable aid in your work — and, of course, a Wright Engineer will gladly survey your water system and submit a comprehensive water conditioning program. Without obligation.

The Wright Calculator will be sent free to water treating engineers and others responsible for protection of water systems. Please send your request on a company letterhead to:

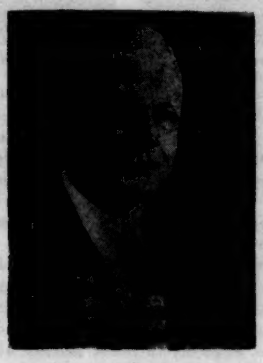
Wright CHEMICALS

WRIGHT CHEMICAL CORPORATION
GENERAL OFFICES AND LABORATORY 633 W. LAKE ST., CHICAGO 6, ILL.
Offices in Principal Cities
(Havana, Cuba; Domenech & Co., S. A., 405 Obrapia)
• SOFTENERS, FILTERS AND OTHER EXTERNAL TREATING EQUIPMENT
• NELSON CHEMICAL PROPORTIONING PUMPS

MANUFACTURERS' NEWS

Lauer Elected Chairman of Board York Division Borg-Warner Corp. — Haase Named President

THE elevation of Stewart E. Lauer to the Chairmanship of the Board of the York Division of Borg-Warner Corporation was announced January 7. Mr. Lauer has been president of York since 1940, in which period he guided the company to a position of outstanding leadership in the air conditioning and refrigeration industry.



Stewart E. Lauer
Chairman of Board
York Div. Borg Warner Corp.

The chairmanship of York now has been relinquished to Lauer by Roy C. Ingersoll, who has served in that capacity in addition to his responsibilities as Chairman of the Board of Borg-Warner since York Corporation was merged with Borg-Warner in July, 1956.

With the promotion of Lauer it was announced that Henry M. Haase, vice-president in charge of engineering and research for Borg-Warner, has been named president and chief executive officer of York. Haase will continue as a vice-president of Borg-Warner but will not direct the corporation's research and engineering activities.

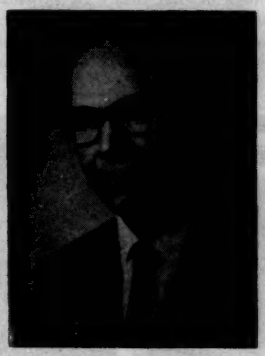
These actions were taken at a meeting of the York Board of Directors in Chicago, at which time all other present officers of the York Division were continued.

Lauer's entire business career of almost forty-six years has been spent with the York Corporation and its predecessors. After graduation from the University of Pennsylvania in 1911 with a degree in Mechanical Engineering, he entered the employ of York as a student trainee. In 1919 he was assigned to York's Western agencies of which he became vice president and a director.

Recalled to York in 1928 by the late Thomas Shipley as assistant to the president, he was later appointed vice-president and general sales manager, and was elected to the presidency in 1940.

Lauer's business activities include two terms as president of the Air Conditioning and Refrigeration Institute of which he is currently a member of its Advisory Committee. He was a director of the National Association of Manufacturers for seven consecutive years and served one term as one of its national vice presidents. He is a director and a member of the Executive Committee of the Machinery and Allied Products Institute, a director of the York Hospital, and president and a director of the Yorktowne Hotel in York, Pennsylvania. He is a past president and a director of the York Manufacturers' Association.

During World War II he was an industry member of the Regional War Labor Board III. He served for seven years as a member of the State Planning Board of the Commonwealth of Pennsylvania. He is a life member of the American Society of Refrigerating Engineers and recently was awarded an honorary degree of LLD by Ursinus College, of which he is a director.

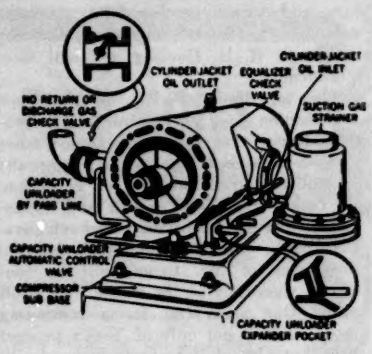


Henry M. Haase
President
York Div. Borg Warner Corp.

Henry Haase came to Borg-Warner in January 1955 from McCray Refrigerator and Palmer Manufacturing Company, where he had served as President and General Manager for about three years. Between 1934 and 1951 Haase held various executive positions in product engineering and general administration with Fairbanks, Morse & Company, including the General Managership of that company's Beloit (Wis.) Works. While in Beloit he was president of the Beloit Association of Commerce, a director of Beloit Municipal Hospital, and a committeeman for the Wisconsin Manufacturers' Association and the Wisconsin Taxpayers' Alliance. He is an engineering graduate of the University of Wisconsin.

The other officers continued were: J. K. Louden, vice-president, manager commercial division; R. K. Serfass, vice-president, manager industrial division; R. F. Lauer,

FES
FULLER


CYLINDER JACKET OIL OUTLET
EQUALIZER CHECK VALVE
CYLINDER JACKET OIL INLET
NO RETURN OIL DISCHARGE GAS CHECK VALVE
SUCTION GAS STRAINER
CAPACITY UNLOADER BY PASS LINE
CAPACITY UNLOADER AUTOMATIC CONTROL VALVE
COMPRESSOR SUB BASE
CAPACITY UNLOADER EXPANDER POCKET

MOST POPULAR REFRIGERATION BOOSTER
FULLER ROTARY
Featuring Capacity Unloading

1925
C-279

FREEZING EQUIPMENT SALES, INC.
423 WEST MARKET ST. YORK, PENNA.
Qualified Distributors in principal cities
Low Temperature Freezing Equipment

ECONOMIZE!
STANDARDIZE!
on "Rempe"
PIPE BENDS AND COILS
FOR REFRIGERATION

Rempe Shell and Coil Assembly
for sub-zero or high temperature heat transfer.

In Rempe Coils you get Top Engineering and Quality Construction — the best in Refrigeration Equipment for long-life and low maintenance.
For Ammonia or Freon. All materials — Stainless Steel, Copper, Steel.

REMPE COMPANY
3465 N. Sacramento Blvd., Chicago 12, Ill.

vice-president engineering and research; J. M. L. Joslin, vice-president industrial relations; M. G. Munce, vice-president marketing services; D. M. Magor, vice-president controller; W. F. Lynne, secretary and treasurer; Jay Silar, assistant treasurer; C. W. Fenninger, Jr., assistant secretary; R. H. Dowling, assistant vice-president.

The top level elections in the York organization were accompanied by an announcement that this large Borg-Warner division is embarking upon a major and carefully planned program of expansion.

"York's impressive growth and expansion in the air conditioning and refrigeration fields, largely achieved during the presidency of Mr. Lauer, will be continued vigorously in the future," Ingersoll said. "Our plans call for a continuing modernization not only of York's product lines but also of its manufacturing facilities."

"Included among York's new products will be heat pumps for domestic application, a larger line of heat pumps for industrial application, and newly designed central heating and air conditioning systems for homes. An extensive line of new industrial and commercial refrigeration products is currently in the final stages of development and testing."

"It also is the intention of Borg-Warner to continue to strengthen the fine organization which Lauer has built."

Ingersoll pointed out that under Lauer's direction, York has grown to become one of the leading manufacturers in its field and the largest employer in York. In the course of this growth, Ingersoll said, York achieved a world-wide reputation for pre-eminence in engineering and production, accompanied by a growth in sales of over 500 per cent to a peak of $93 million and a growth in employment of over 150 per cent to a peak of 7,000.

Air Conditioning Installed in Tallest Building

York air conditioning equipment currently is being installed in the tallest and one of the largest buildings in the world —the Empire State Building in New York —and in the world's largest hotel, Chicago's huge Conrad Hilton. York products, comprising every type of air conditioning equipment, from the smallest window units to the largest industrial units, have been installed in many other well known skyscrapers, stores, factories, hotels and apartment buildings, as well as in small dwellings throughout America and in other parts of the world.

"The full strength of Borg-Warner's extensive research and engineering facilities, its manufacturing and marketing experience and its sound financial position will support York's program of growth," Ingersoll said. "The air conditioning industry offers a brilliant future. Borg-Warner, through York, intends to take full advantage of that future by providing the consuming public with the most expertly engineered, efficiently manufactured and highly modern products on the market."

Sales Engineers Join Staff ACME Chicago Office

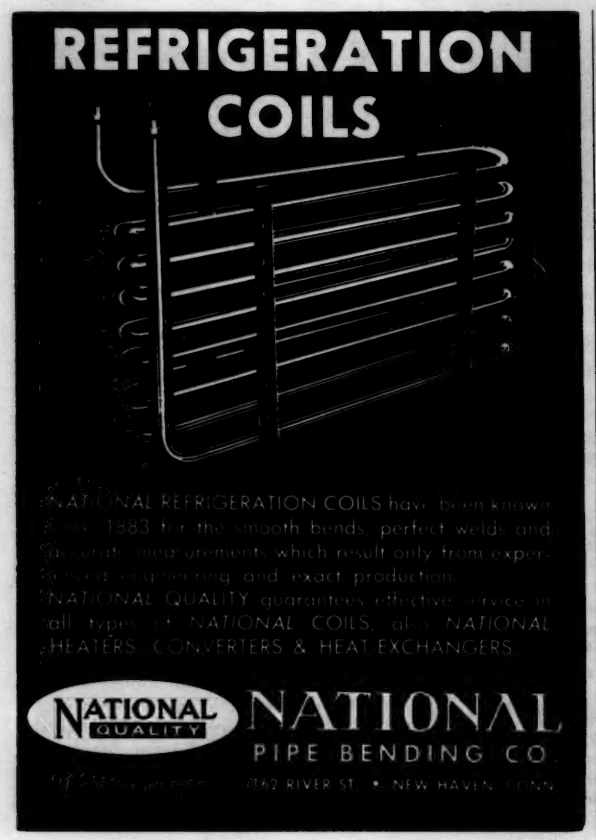
APPOINTMENT of two sales engineers for its Chicago Regional Office has been announced by Wm. R. Eichelberger, vice president-director of sales, of Acme Industries, Inc., manufacturers of a complete line of air-conditioning equipment and components, cooling towers, evaporative condensers, and heat pumps.

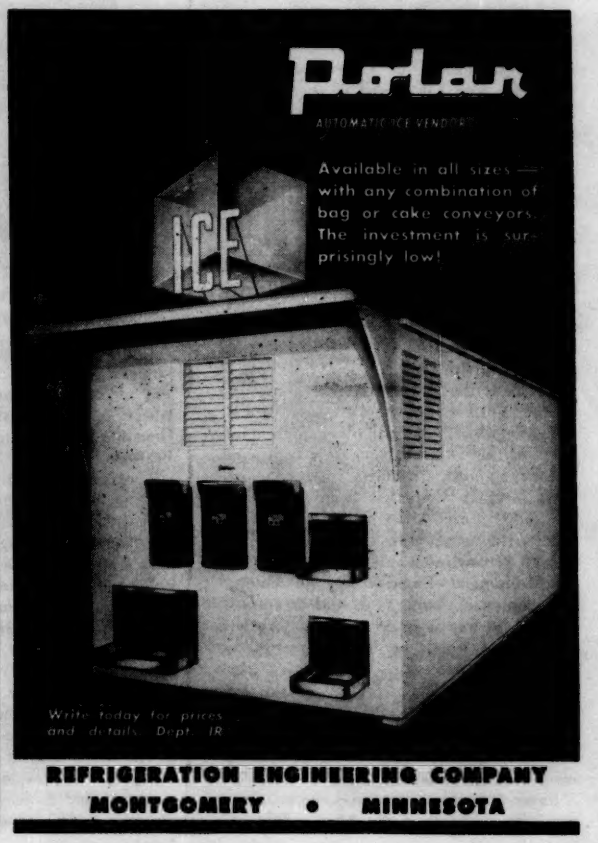
Irvon E. Corwin

Valdi Landman

Irvon E. Corwin comes to Acme with a wide background of experience in the sales and servicing of all types of air-conditioning and refrigeration equipment. His educational background includes the study of Business Administration at Michigan State University. He is an Army veteran of World War II.

Valdi Landman, a native of Latvia, came to the United States in 1946. He has spent the last ten years handling domestic and export sales for retail organizations, engineering firms, and for air conditioning and refrigeration manufacturers.




Polar
AUTOMATIC ICE VENDORS
Available in all sizes — with any combination of bag or cake conveyors. The investment is surprisingly low!
ICE
Write today for prices and details. Dept. IR
REFRIGERATION ENGINEERING COMPANY
MONTGOMERY • MINNESOTA

Caterpillar Tractor Plans New Industrial Engine Plant

The Decatur, Illinois, plant shown here typifies the kind of structure which will house the new Industrial Engine factory to be built by Caterpillar Tractor Co.

PLANS to build a 500,000-square-foot industrial engine plant have been announced by H. S. Eberhard, president of Caterpillar Tractor Co. The Peoria firm also announced its intention to construct a multi-building research center and a general offices Building. All three facilities will be located on an 1,100-acre site 12 miles north of downtown Peoria.

Site preparation for the industrial engine plant is scheduled to begin within the next few months and construction dates for the research center and general offices building will be established after planning and necessary engineering work have been completed. Operations will begin during 1958 and 1959 in the new area.

Construction of these facilities will be an important part of the Company's overall building program — the total cost of which is estimated in excess of $200 million for the next three years. It is expected that approximately 3,500 people will be employed in the new area when all facilities are completed. Of this number of people, about 1,200 will be employed in the industrial engine plant.

In commenting on the new Industrial Engine Plant, Mr. Eberhard said: "Four years ago, an Engine Division was established to provide an organization which could concentrate on the many special requirements of the industrial engine business. The results of this move now lead us to construct a new and separate facility in order to provide the Division with maximum flexibility to most effectively serve engine customers."

The new plant will be the source of manufacture for Caterpillar V-type engines ranging up to 650 maximum horsepower in the current line. The source for all other engines will continue to be the Peoria Plant. Basic engines intended for industrial use will be moved to the industrial engine plant where attachments, specially engineered to equip them for use as industrial and torque converter power units, marine engines or electric sets, will be added.

New Armstrong Salesmen

THE names of 11 new members of the Company's Insulation Division field sales organization has been announced by the Armstrong Cork Company. The new salesmen and their assignments are: John W. Lowe, Atlanta District Office; Richard H. McIntosh, David T. B. Norton, and Scott S. Miller, Philadelphia District Office; Edward H. Johnson and Robert C. Nichols, Baltimore District Office, James A. Boylan, Cleveland District Office; Donald R. Calvert, Buffalo District Office; William H. Haelig, Jr., Dallas District Office; Richard J. Halder, St. Louis District Office, and Richard R. Voorhees, New York District Office.

Michigan Ice Machine Co. Consolidates With Detroit Ice Machine Co.

THE MICHIGAN Ice Machine Company, Detroit, Mich., jointly owned by C. M. Lewis and E. P. Callanan will discontinue business as of February 1, 1957, due to the retirement of Mr. Lewis.

Mr. Callanan will join the Detroit Ice Machine Company at that time as a director in charge of the ammonia refrigeration division. Detroit Ice Machine Company will take over the franchise of the Frick Company in the sale of ammonia and "Freon" refrigeration and air conditioning equipment. This will renew a distributor relationship which existed from 1916 to 1948. Mr. Callanan is a graduate of St. Thomas College, St. Paul, Minn., and was associated with Vilter Manufacturing Co., Milwaukee for eleven years. He has been co-owner of the Michigan Ice Machine Company for thirteen years.

Other key employees of Michigan Ice Machine Company will go along with Mr. Callanan and it is expected that this consolidation of the personnel of the two companies will place Detroit Ice Machine Company in an excellent position to be of service on refrigeration and air conditioning needs.

New Jamison Representative

McCOMBS Supply Company, Denver, Colo., has been appointed manufacturer's representative for Jamison Cold Storage Door Co., Hagerstown, Md. McCombs will represent Jamison in the entire Rocky Mountain area. The firm offers Jamison extensive experience in handling and servicing cold storage equipment. John V. Berger, who has been with McCombs for 10 years, is in charge of Jamison sales and service. McCombs is located at 1819 Wazee Street in Denver.

PIPE COILS

FABRICATIONS, Welded Headers or just single bends — whatever you need, our expert metalworkers can produce them to your exact specifications. Even in stainless steel, or up to 6-inch extra heavy. For quality work, backed by 37 years' specialization, call on us!

We'll gladly quote on your next job.

CHICAGO NIPPLE MANUFACTURING CO.

1997 CLYBOURN • CHICAGO 14

NOYO

Shredded

REDWOOD BARK INSULATION

•

UNION LUMBER COMPANY

620 Market St., San Francisco

Los Angeles
Park Ridge, Ill.
New York

complete refrigeration engineering service

Specialists in —

- Warehouses — Refrigeration and Insulation
- Food-Freezing
- Low Temperature Refrigeration
- Design of
  Non-Frost Heaving Floors
  Frost-Free Vestibules

Backed by a quarter-century of national and international experience, V. C. Patterson & Associates staff of specialized engineers is available to aid you with your refrigeration, insulation, food-freezing, warehousing, and allied problems. For new construction or for renovating present facilities, you'll find our engineered plans will mean greater efficiency and real money-saving operations. What's your problem? Write us.

V. C. PATTERSON
& ASSOCIATES, INC.
415 West Market Street - York, Pa.
(Phone 82-058)

VAN RENSSELAER
H. GREENE
ENGINEERS
COMPLETE PLANT DESIGNS INCLUDING BUILDING AND EQUIPMENT
11 PARK PLACE NEW YORK 7, N. Y.

FRED OPHULS
& ASSOCIATES
Consulting Engineers
112-114 West 42nd St. New York City 36
Industrial Power Plants
Refrigeration and
Cold Storage Warehouses,
Reports, Appraisals and Management

CATALOGS AND BULLETINS

Chart Estimates Insulation Needed For Cylinders

AS AN AID to estimating the amount of material necessary to insulate cylindrical vessels, the Armstrong Cork Company has developed a chart for converting gallon quantities into square feet of surface area. The chart was developed to eliminate complex mathematical calculations when vessels, such as domestic hot water tanks and expansion tanks, are designated only by gallon size, or by length and diameter.

Gallons	Diam. Inches	Length Feet	Insul. Surface Sq. Ft.
30	18	2	14
66	20	4	28
85	20	5	33
100	24	4	35
120	24	5	41
140	24	6	48
150	30	4	44
180	30	5	52
220	30	6	61
250	30	7	70
295	30	8	78
315	36	6	75
365	36	7	85
420	36	8	95
525	36	10	115
430	42	6	90
500	42	7	101
575	42	8	113
720	42	10	136
865	42	12	159
1000	42	14	182
750	48	8	131
940	48	10	158
1130	48	12	184
1300	48	14	210
1500	48	16	236
1700	48	18	262

Note: Above units include shell and two heads.

Armstrong Cylindrical Conversion Chart for estimating square feet of insulation from gallon capacity of cylindrical vessels

A quick glance at the chart tells users that a 525-gallon tank will require 115 square feet of material to insulate the shell and both heads, or that a tank 30 inches in diameter and six feet long will need 61 square feet of insulation. Armstrong has released the chart for use by those who work with cylindrical vessels.

Heat Exchangers

A NEW 16-page catalog issued by The Young Radiator Company, Racine, Wis., covers the new line of removable tube bundle heat exchangers Type R and RW. Catalog contains all necessary design, capacity and dimension data required for complete selection and specification of exchangers for hydraulic equipment, Diesel engines, gas engines, compressors, transformers, machine tools, cutting fluids and similar applications, and for chemical, pharmaceutical and food processing.

Kramer Trenton Distributes General Catalog

ADVANCE copies of a new condensed general catalog No. R-400 are now being distributed by Kramer Trenton Co., Trenton, N. J. This catalog introduces a completely redesigned line of Wedge units for ceiling mounting in reach-in refrigerators. The over-all dimensions of these units have been reduced. New extra-large Unicon air-cooled condensers for the big jobs of 240 tons and higher are listed along with simplified rapid selection tables. A new method of selecting Unicon applications for various locations in the U. S. is presented as well as a quick, easy method for selecting multi-circuit UNICONS for supermarket applications. The Kramer all-season winterstat, which automatically maintains full high side pressure all the way to the expansion valve at any outdoor temperature, is included.

New extra-large Coolmaster units rated at 80,000 Btu per hour at 10° T.D. are also shown for the first time. These units are available with centrifugal blower wheels for installations requiring duct work or propeller fans for free air discharge.

Ratings, dimensions and rapid selection tables for various temperature levels are given for the "L" Thermobank automatic hot gas defrosting system which uses a heat storing re-evaporator to prevent liquid refrigerant from reaching the compressor suction. Complete rapid selection tables for 35 F walk-in coolers, OF freezers and minus 20 F freezers are featured and a pressure temperature chart covering a wide range has been added.

New Price List For Dean Cold Plates

A NEW price list No. 506, has been issued for all zinc metallized plates by Dean Products, Inc., 1042 Dean Street, Brooklyn 38, N. Y., manufacturers of Dean Cold Plates "job tailored" to specific requirements. Dean Cold Plates, which are now available in a greater number of standard sizes, are available in special alloys such as stainless steel and monel. Special assemblies are also available. The plates may also be obtained in a variety of shapes such as cylinders, U's, angles, tanks, etc.

New Bulletin on Pumps

A NEW bulletin on Verti-Line close coupled industrial pumps has been issued by Layne & Bowler Pump Co. Los Angeles, Calif. An easy to use table for determining horsepower, capacity and head for vertical pumps makes this bulletin worth keeping. Also contains sectional views, material specifications, schematic application drawings, and photos of installations. Verti-Line Pump features are clearly illustrated.

New Chart For Predicting Cooling Tower Operation

A UNIVERSAL "counter-flow cooling tower selection and performance chart" was described by John Engalitcheff, Jr. at the 43rd semiannual meeting of The American Society of Refrigerating Engineers held in Boston, Mass. Mr. Engalitcheff, a member of ASRE, is president of the Baltimore Aircoil Company.

This new chart permits the selection of a cooling tower and the predicting of its performance at any other conditions, and the evaluation of the performance of an installed cooling tower. With one test taken at any operating conditions, it is possible to determine if the tower is delivering its rated capacity and predict the tower's performance at any other operating conditions.

The chart will be made available to any company wishing to use it, providing the company obtains written permission from the author, and acknowledges the source of publication.

V-Belt Drive Manual

A NEW 66-page V-belt drive engineering manual has been issued by The Maurey Manufacturing Corp., Chicago, Ill. This manual will prove a ready and complete source of needed information to all users of V-belt drives, and V-drive designers. It is organized to provide quickly facts and figures wanted by the production man, the engineer and designer. It is divided into three general sections: (1) V-drive Selection, devoted to drive service factors, instruction on how to select a stock drive, and complete V-belt drive tables for A, B, C, D and E section V-belts. (2) Drive design section provides "How to Design" instructions and data. (3) General information section.

New Catalog of Industrial Insulating Materials

FULL specifications for the complete line of spun mineral wool industrial insulating products are presented in a new catalog published by the Baldwin-Hill Co. The catalog, which lists standard sizes, thicknesses, and thermal conductivities for more than 20 types of heat and cold insulations for equipment and piping, also includes temperature-thickness recommendations for each.

In addition to the characteristics of the materials themselves, the twenty-page, three color catalog describes typical applications and provides application instructions. Baldwin-Hill's spun mineral wool insulations, which include Mono-Block, white Super Powerhouse Cement, and new spun Duct Insulation, are featured in the booklet. All materials are identified according to the Federal, Commercial, Navy Department, U. S. Maritime Commission and ASTM standards met.

Trane Adds Data To Compressor Bulletin

A REVISED "Reciprocating Compressor" bulletin is available from The Trane Company, La Crosse, Wisconsin, manufacturers of air conditioning, heating, ventilating and special heat transfer equipment. Included for the first time are ratings and data on the firm's 125 and 150 horsepower compressor and condensing units.

Ratings on Trane 60, 75 and 100-ton condensers have been revised to conform with a new condenser, which incorporates water heads at both ends. The double-head design permits increased cleaning ease of condenser tubes.

Low Temperature Insulation Specifications

A NEW 20-page booklet, "Specifications for Low Temperature Space Installations", has been published by the Pittsburgh Corning Corporation.

The booklet contains complete information on the latest recommended methods for installing FOAMGLAS cellular glass insulation on walls, floors, ceilings and roofs of refrigerated spaces operating between −50°F and +50°F. It lists suggested thicknesses as well as recommended adhesives, finishes, paints and other accessories for use with FOAMGLAS in low temperature installations. The material is presented in an easy to read fashion.

Classified Advertising

All classified advertisements are payable in advance. Except for Positions and Help Wanted classifications, this section is reserved exclusively for USED equipment.

RATES: 20c per word; minimum 25 words. $2.00 per line for bold face headings: $15.00 per inch for line listings.

USED EQUIPMENT—wanted & for sale

FOR SALE — Refrigeration equipment; ice equipment; new, used. Advise us your needs. Use "QUICKSEAL" — stops brine tank leaks; easy, efficient, economical. Born Company, 80 East Jackson Boulevard, Chicago 4, Illinois. WAbash 2-3299

FOR SALE — 13¼" x 9" Frick booster compressor. 9" x 9" Frick compressor; 75 h.p. motor. Write R. H. Boxman & Brothers, Inc., 1050 Granby St., Baltimore 2, Maryland.

FINNED PIPE FOR SALE—48 lengths 12' each Made from 2" steel pipe-7" square fins 1½" apart; galvanized. New at only $3.00 per foot. Also 100 steel Hand Trucks. Medium duty; roller bearing wheels. New at $6.00 each. West Side Cold Storage Co., 7 Harrison St., New York 13, N.Y.

FOR SALE
2—10"x10" 2 cyl. Frick D.C. to 100 hp motor.
2—10"x10" 2 cyl. York D.C. to 100 hp motor.
3—9"x9" 2 cyl. York D.C. to 75 hp motor.
1—8"x8" 2 cyl. Frick D.C. to 75 hp motor.
1—7¼"x5" Frick booster.
2—50 ton G.E. Freon condensing units.
1—50 ton Buffalo Freon evap. condenser.
1—6"x6" Frick compressor.
1—5"x5" York compressor.
3—9¼x14" 115 hp Wolverine Diesel engines.
11x22x47" and 11x22x51" ice cans.
Ice plant — 20 to 160 tons.
ENTERPRISE EQUIPMENT CORPORATION
77 Alexander St. Yonkers, N. Y.
Cable ENEQCO Phone: Yonkers 8-8118-9

FOR SALE
310 ton York Turbo water chilling unit.
9x9 York direct connected to 75 h.p. motor.
10x7½ York & 8x6 York Model D-8 boosters.
8x8 Frick w/V-belt drive to 75 h.p. motor.
6x6, 5x5, 4x4 York Model D-8 compressors.
5x5 & 4x4 York self contained units.
(2) 6'x16" Coded receivers w/valves.
Condensers, Receivers, Motors, etc.
JOHN F. CARSON
A & Venango Sts. Philadelphia 34, Pa.
GArfield 6-2221

MUST SELL THESE COMMERCIAL REFRIGERATION UNITS TO SETTLE ESTATE. 3x3 Frick and York units, 4x4, 6x6 and 7x7 Type G Fricks; horizontal Frick shell and tube condenser 16"x15'. Receiver 20"x7'. W. C. Daugherty, 148 S. Darlington, Tulsa 12, Okla.

FOR SALE—4x4, 5x5, 8x8 Fricks, 5x5, 8x8 Yorks; 13 ton shell & tube condenser, 7½ and 9x9 York crank shafts. Write E. Niebling, 1546 St. Clair Ave., Mt. Healthy, Cincinnati 31, Ohio.

FOR SALE—AMMONIA—FREON
1—3-¼x3"—8 cyl. V/W York belt driven ammonia compressor.
1—5¼"x4¼"—6 cyl. V/W York ammonia booster comp.
1—6-¾"x5"—6 cyl. V/W York booster ammonia comp.
1—25 ton Chrysler Air Temp. Freon condensing unit, complete.
1—40 ton General Electric Freon condensing unit, complete.
1—50 ton General Electric Freon condensing unit, complete.
1—50 ton Buffalo Freon evaporative condenser.
ENTERPRISE EQUIPMENT CORPORATION
79 Alexander St. Yonkers, N.Y.
Cable: ENEQCO Phone Yonkers 8-8118-9

USED EQUIPMENT—continued

WANTED TO BUY—60-75 ton shell & tube brine chiller. Must be reasonably priced and in good condition. Write P. O. Box 132, Toledo 12, Ohio.

FOR SALE—1 Frick 8 x 8 ammonia compressor, with 60 h.p. motor. 1 28-ton Vilter HO evaporative condenser, 3 years old. Write E. E. Schaus, 642 Park Ave., Glen Ellyn, Ill.

FOR SALE — ICE CANS, about 200. Size 11½ x 22½ x 44 inside. Good condition. Bargain price $4.00 each. Write Independent Ice Co., 3714 Commerce St., Dallas 26, Texas.

Positions and Help Wanted

WANTED — Refrigeration Engineer; frozen food plant located in Michigan. Must be experienced in operating and maintenance. Earnings over $5000. per year. Opportunity for advancement. Ammonia plant capacity about 150 tons. Write Box JA-8, c/o Industrial Refrigeration.

CHIEF ENGINEER WANTED
for small ice plant in South Florida. Should have some knowledge of oil engines. Write details of your qualifications and experience to P.O. Box 7531, Coral Gables 34, Fla.

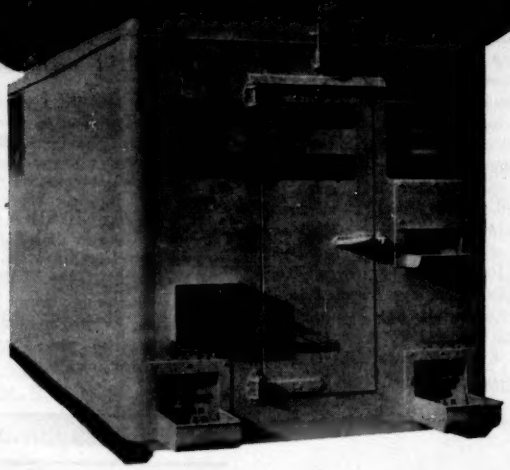
POSITION WANTED — 13 years experience construction-servicing of Industrial Refrigeration, Air Conditioning plants, both ammonia and "Freon". Detailed knowledge electrical circuits and controls. Last 6 years and presently employed as Field Erection and Service Engineer. Supervisory ability proven; self educated, married, age 31. Will relocate anywhere. Complete resume on request. Desire position in supervisory capacity. In reply state position, location, salary to Box FB-3, c/o Industrial Refrigeration.

S&S

LEADER FOR 28 YEARS

offers the industry

THE BIG 5



1. The Finest Vending Equipment Made
2. Most Attractively Priced
3. Easiest to Buy—10% down, up to 5 years to pay
4. With the Exclusive Add-O-Matic Coin Control, also National Rejector
5. 3-Week Shipping Schedule

These are the reputable dealers to serve you:

Ballard Sales Company	Fort Worth, Texas
J. P. Carlisle Company	Greensboro, No. Carolina
Goscin Sales Company	Denver, Colorado
Ice Plant Equipment Company	Philadelphia, Pennsylvania
E. L. Lowie Company	Gastonia, No. Carolina
Daniel Smerling	New Haven, Connecticut
Sisco Products Company	Buford, Georgia
Vivian Mfg. Company	St. Louis, Missouri
Robert E. Ames	San Bernardino, Calif.
Western Ice Equipment	San Francisco, California
Robert Walton	Indianapolis, Indiana
Preston Refrigeration Company	Kansas City, Missouri

In Canada:

Kenneth C. McCrea Company	Niagara Falls

Export Division:

Douglas M. Homs Company	San Francisco, California

"YOU CAN JUDGE S&S BY THE CUSTOMERS IT KEEPS"

S&S VENDING MACHINE COMPANY
670 LINCOLN AVENUE • SAN JOSE, CALIFORNIA

ADVERTISERS

Bower Chemical Mfg. Co., Henry 43
Brown Mfg. Co., Inc., K. G. 40
Butcher Boy Refrigeration Door Co. 1

Carrier Corp. ..... 3rd Cover
Caterpillar Tractor Co. 10
Chicago Nipple Mfg. Co. 53
Classified Advertising 55
Creamery Package Mfg. Co., The 45

Dole Refrigerating Co. 46
Dunham-Bush Inc. 31

Enterprise Equipment Corp. 55

Freezing Equipment Sales, Inc. 51
Frick Co. 41

General Chemical Div., Allied Chemical & Dye Corp. ..... 28 and 29
Greene, Van R. H. 54

Howe Ice Machine Co. 47

Jamison Cold Storage Door Co. ..... Outside Back Cover

Kinetic Chemicals Div., E. I. DuPont de Nemours Co. Inc. 12
King Co. of Owatonna, The 41
King — Zeero Co. 37

MMM Inc. 39

National Pipe Bending Co. 52
Niagara Blower Co. 9
Nickerson & Collins Co. ..... 42 and 48

Ohio Galvanizing Mfg. Co., The 38
Ophuls & Associates, Fred 54

Patterson & Assoc. Inc., V. C. 54
Perfection Ice Scoring Machine Co., The 38
Phillips & Co., H. A. 7
Pittsburgh-Corning Corp. Inside Front Cover
Presstite Keystone Engineering Products Co. 48

Refrigeration Appliances, Inc. 44
Refrigeration Engineering Co. 52
Reilly-Benton Co., Inc. 26
Rempe Co. 51

S & S Vending Machine Co. 56
Shank Co., Cyrus 8
Swift & Co. 3

Taylor Instrument Companies 5

Union Lumber Co. 53

Vilter Mfg. Co. 6
Vogt Machine Co., Henry 25

Wanted and For Sale Advertising 55
Wright Chemical Corp. 50

EXPERTS LIKE TO DO BUSINESS WITH EXPERTS

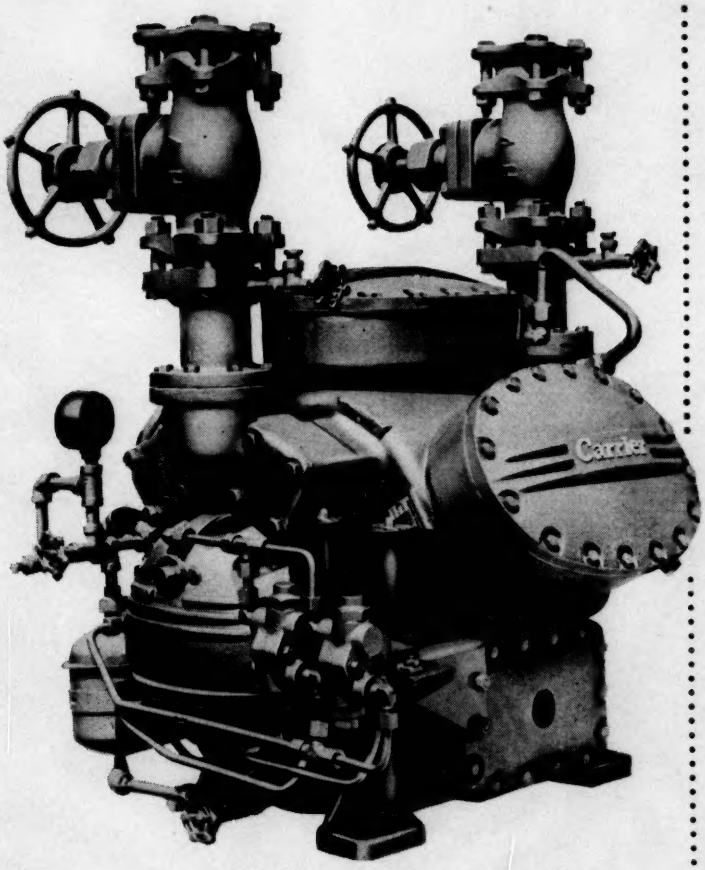
FRANCIS D. ELLIS, INC.

CHOOSES

CARRIER

AMMONIA

REFRIGERATION



This is a short-short success story. Title: "How Carrier ammonia refrigeration saves Francis D. Ellis, Inc., Philadelphia, $4000 per year."

Until recently, Francis D. Ellis (wholesale meat) was renting cold brine service from a street pipeline. When the charge for this service was raised to $5800 a year, Mr. Ellis decided to install a Carrier ammonia refrigeration system. The yearly cost of electricity to run the system is only $1800. His saving—$4000 a year. At that rate he'll pay for his refrigeration system in a hurry, then go on pocketing the difference.

What's more, Mr. Ellis claims the condition of his cut meat is better because the brine temperature can be controlled to meet humidity demands. And now he can defrost by simply shutting off the brine for a short while instead of chopping ice off the coils.

Carrier refrigerating equipment is on the job in food processing plants, large and small, all over the world — serving companies like Rath Packing Company, Waterloo, Iowa; Dole Pineapple, Honolulu; Geo. A. Hormel, Austin, Minnesota; Minute Maid, Davenport, Florida.

May we assist you?

Whether you need a complete refrigerating system or a single machine, bring your problem to Carrier. Call your nearest Carrier office. Or write Carrier Corporation, Syracuse, New York.

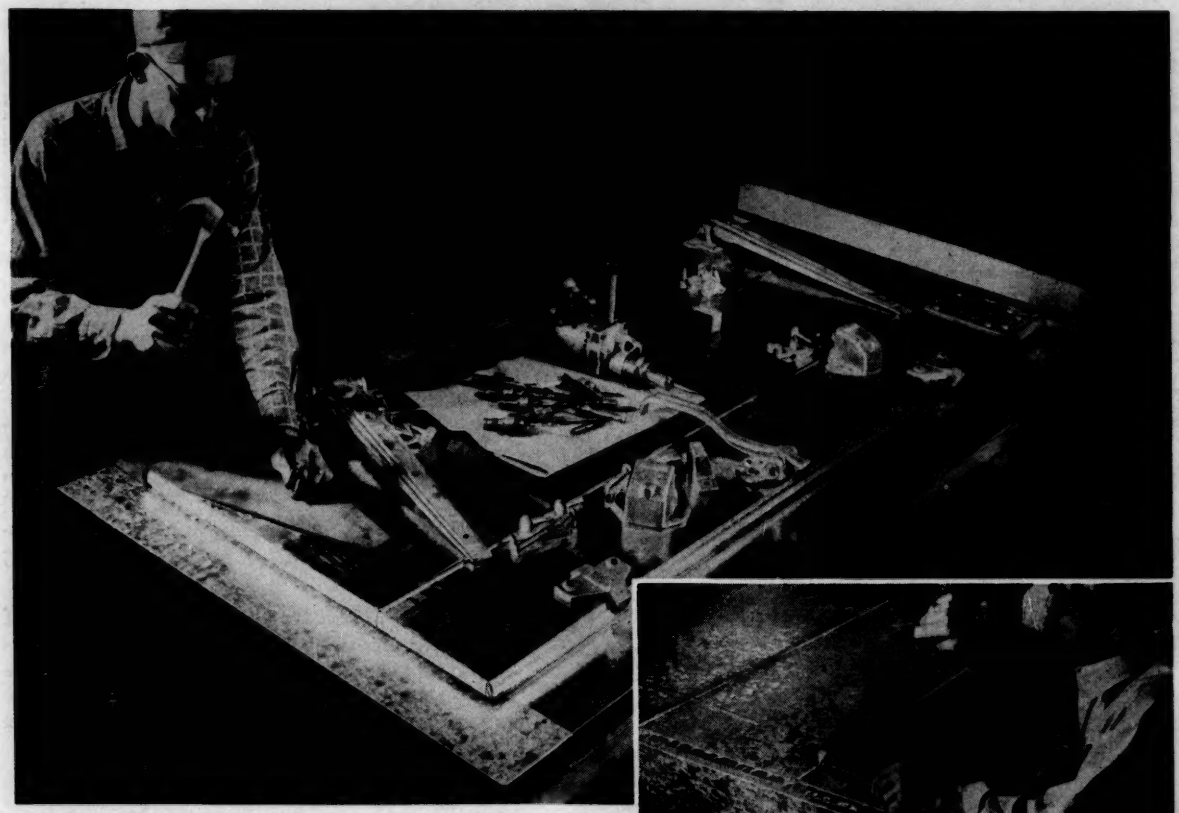
Carrier

ammonia

refrigerating

systems

NEW Jamison VAP·R·TYT* feature gives metal clad doors full protection against moisture penetration

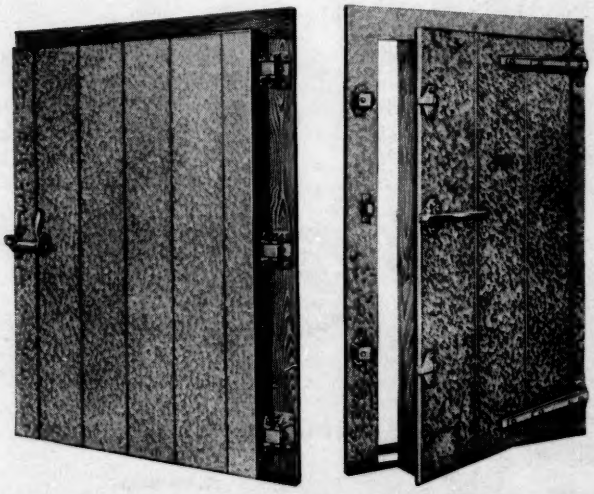


Sealed Penetrating Bolts. The bolts that attach hardware are completely sealed on the warm side.

Locked and Soldered Seams (right) also add to all-around protection.

Vap-r-tyt construction of locked and soldered seams and sealed penetrating bolts is an exclusive Jamison feature. Vap-r-tyt adds longer life to cold storage doors by guarding against deterioration which invariably results when moisture condenses on the inside of the door.

For practical solutions to your door problems in low temperature storage, first get the facts from Jamison. Write to Jamison Cold Storage Door Co., Hagerstown, Md.



All Jamison Super Freezer Doors (left) and Lo-Temp Doors (right) are furnished with Vap-r-tyt construction as standard equipment. Vap-r-tyt is also available as an extra on other metal clad doors.

**Vap-r-tyt is a Jamison trademark*

More JAMISON Doors are used by *more* people than any other Cold Storage Door in the world.